

NATURE MAGAZINE

September, 1943

35 Cents

Vol. 36, No. 9

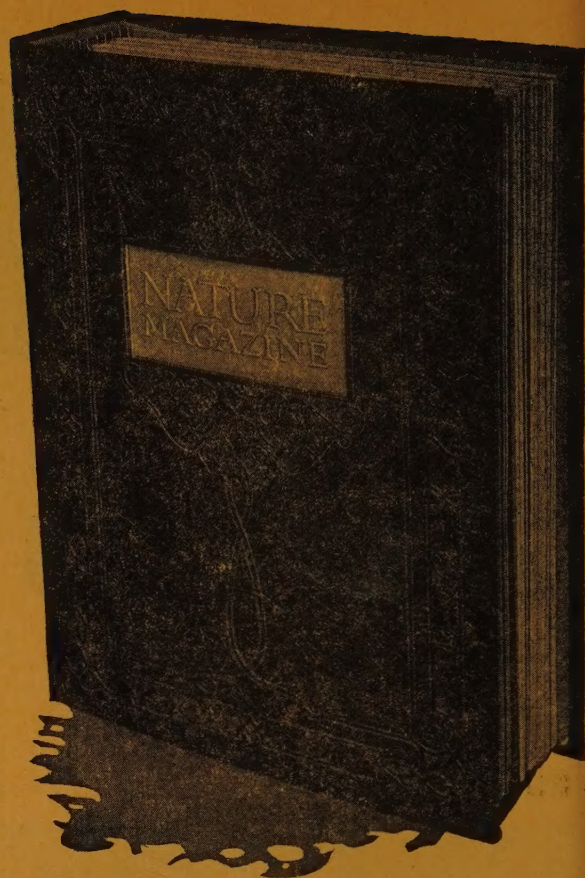


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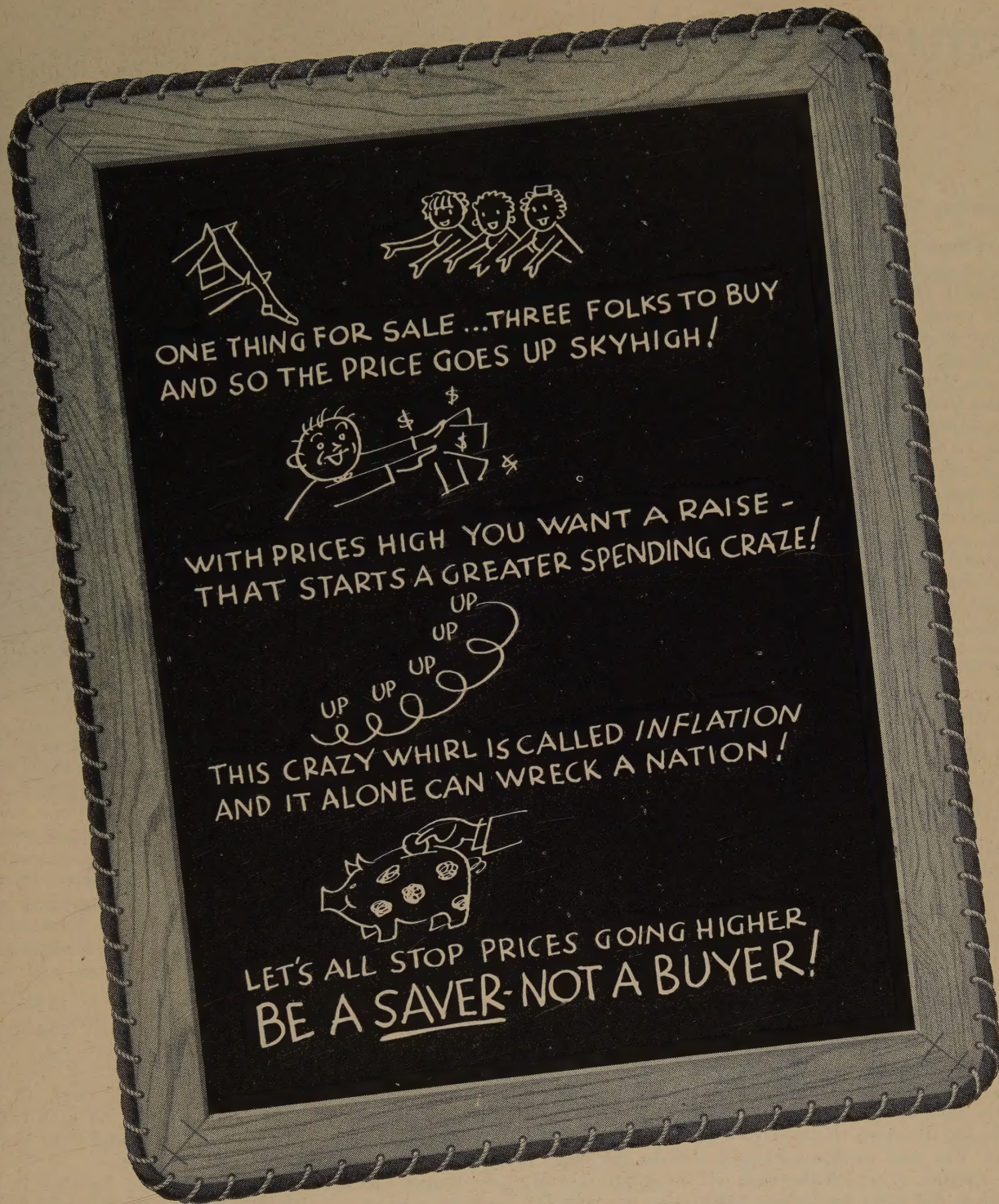
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This advertisement, prepared by the War Advertising Council, is contributed by this magazine in cooperation with the Magazine Publishers of America.

Camera Trails

By NORRIS W. HARKNESS

The Hunting Season

NOVEMBER is proverbially the hunting season, but the average hunter misses most of the chief thrill. His success depends partly on skill, but fully as much on his equipment. If he gave up his rifle and shotgun and used a bow and arrow, he would regain much of the thrill of personal accomplishment, but he still would be far behind the man who goes hunting with his camera.

The photographer who develops sufficient skill in stalking, or in setting camera traps to get really good pictures of wild mammals and birds, has accomplished something rare and satisfying. Think of the comparative jobs of the gunner and the photographer, especially when the latter uses average equipment without telephoto lenses and the other gadgets that allow big negatives of far-away objects. The simplest camera will do the work and hundreds of Nature photographers are doing it, but it takes "know-how" and patience.

First of all, of course, you need to be in an area where game is fairly plentiful, but there are few places where no animals challenge the camera man. Your "game" may not be an elephant, or even a brown bear, but a good photograph of a robin is not to be sneezed at and one—a really good one—of a flying butterfly (no, I do not call butterflies game, either!) is so rare as to have been called practically impossible by a well-known museum expert. A park squirrel eating the peanut you just gave him is not exciting, but a good action shot of him as he climbs a tree or races through the branches will be—but it will not be easy to do.

Any such pictures require a combination of the patience necessary to wait until everything is absolutely the way you want it, and then the ability to see that all is right while you make the shot in a sudden rush that still leaves nothing undone or done improperly. The combination is not ordinary, and those who may seem born with it really have to develop all the faculties carefully.

Basically it comes to this: you check the kind of country you are working in and decide the most likely distance at which the shot will be made. Then you check the light by meter, calculator, or experience, and set the shutter and diaphragm to give you the best possible depth of field with the fastest shutter speed you think may be needed. That calls for a compromise, unless you have the fastest film. In bright sunlight—and good hunting country usually involves more shade than you would like—1/100th second at f/11 is a good average exposure, but shade or the hour of the day may demand more exposure.

Almost any living, moving thing requires at least 1/100th second, and 1/200th if the action is fast, so if more exposure is needed, you open the diaphragm more and work at f/8 or even f/5.6. With small cameras, that is quite easy, but with larger ones that have fairly long focal length lenses, the depth of field shrinks so much that your focusing distance must be accurate.

So, with shutter cocked and everything, including



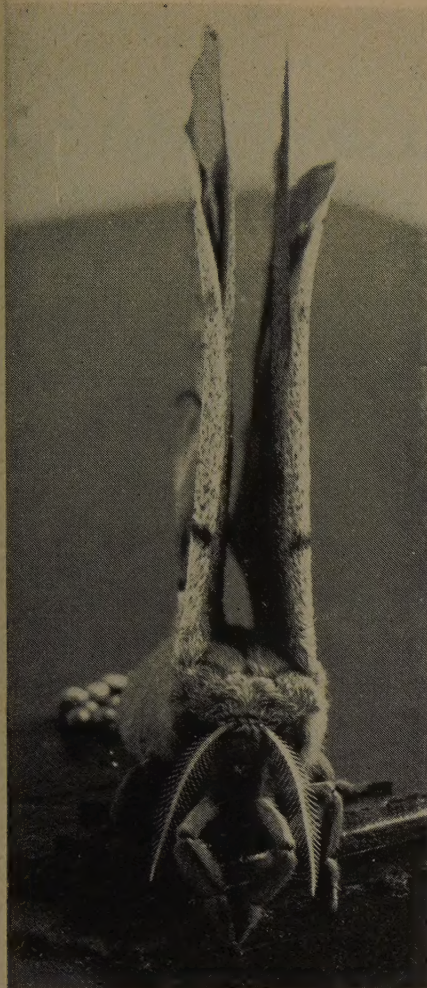
Lloyd G. Miller, of Chicago, who made this shot, says, "The large figure, looking like the spinal columns of two fishes standing out of a fur rug, is the front view of a moth on my camera case." Close-ups like this usually require a double-extension bellows on the camera and extreme care in focusing. A supplementary lens that enables work at short distance will help in handling such subjects. This is an enlargement of part of the picture, showing the whole moth, on facing page.

the lenshood and perhaps the filter, in place, you either wait or walk, always on the alert. You can be certain that the first moment you relax your attention, something good will go by—and be gone. Patience, readiness, like that of the boys on submarine watch, is what is wanted. With a fair start, it all depends on your hunting luck and your skill in making the shot when it can be made.

Remote control shots, whether by flash or in daylight, are of two kinds, the trap shot in which the game photographs itself, and the remote shot that you make by operating the shutter by a cord or some other device from a distance. The automatic ones need simply the right equipment that has been discussed here before, plus the skill to conceal the trap well enough to fool the game.

The remote control pictures require all the patience you have, for you simply set up the camera on some firm support and then wait for the game to appear in the right place. Once they are as you want them, you operate the shutter by a thread or some electrical gadget. An all-electric synchronizer, used without a bulb but with a wire long enough to reach from the camera to your hiding place, will do the trick.

Working from a blind is probably the easiest system and has the advantage of letting you make as many exposures as you please without disturbing



your subjects. The chief factor in your success, is, naturally, the location of the blind and the willingness of the game to approach it.

We usually think of blinds in connection with ducks, but several years ago we spent a grand afternoon in one in a corn field waiting for quail and pheasants. In nearly three hours we, and the two others with cameras, got five shots. Two were at not more than fifteen feet and the rest at about twenty-five, and several of them—among the three cameras—made excellent pictures.

A brushy fence corner will often work well with only little preparation as a blind, and, if its location is well chosen, all that is needed is the patience to wait for your birds. In some parts of the country you might even get a shot at a fox or some other small animal but beware of a too-close-up (as one friend did some years ago) of an inquisitive skunk.

Special equipment simplifies the job of shooting birds and animals, but with the ingenuity and patience demanded for any Nature work that is worth anything, the photographer who is willing to spend the time can use his regular

camera for good pictures and plenty of fun.

Trade Notes

At the moment of writing, the War Production Board has just issued L-267, an order permitting the use of 12 per cent of the 1941 material for the manufacture of photographic apparatus. Despite the rumors that have already sprung up in many sections of the country, this order is not going to provide new equipment for the dealers' shelves—there is no surplus of material for that at present. The order will give manufacturers material to make cameras and other equipment for those who can get adequate priorities. L-267 will give nothing to amateur photographers, but it is a good sign for the future.

Do not forget that Thanksgiving Day with its family gathering provides just about the finest opportunity of the year for Pictures From Home for the men and women in the Armed Forces. Almost every overseas broadcast mentions how much the boys want those pictures, and the advertisements in many newspapers continue to tell the story of what they mean to the men and women so far from home. A shot of the whole family at dinner would mean as much as any you could make for him.

Questions and Answers

D.K.McD. of Carson City, Nevada, asks: "How can I hold the iridescence of a mallard's neck in black and white photography?"

ANS.—You will have trouble in either color or black and white but the principal requirement is accurate exposure at a moment when the light hits his neck perfectly. In black and white work the varying colors will show less and only as slightly differing brilliances. Make the exposure when his head is turned to the right direction and try it with the light fairly well behind the camera. It is hard to get but the effect is wonderful when you really do get it perfectly. Naturally you will have to be quite close to him or use a long-focus lens.

The Camera Trails Department is at the service of readers of Nature Magazine. If you have problems—and who has not, these days?—pass them on and let us see whether we can help you. If we do not know the answer we will say so.

AGE NO OBSTACLE SAYS SUCCESSFUL STUDENT



"Since taking your Course I am making contributions almost weekly. One of the first to be accepted was published in the Michigan Conservation Magazine. Age is not a barrier. If you have the least desire and some initiative, you can learn to write the easy N.I.A. way. NOW is the time to 'cash in' on a writing career." — Mrs. D. T. Owen, R. R. No. 6, 1929 Orchard Ave., Ann Arbor, Michigan.

How do you know you can't write?

Have you ever tried?

Have you ever attempted even the least bit of training, under competent guidance?

Or have you been sitting back, as it is so easy to do, waiting for the day to come when you will awaken, all of a sudden, to the discovery, "I am a writer"?

If the latter course is the one of your choosing, you probably *never will write*. Lawyers must be law clerks. Doctors must be internes. Engineers must be draftsmen. We all know that, in our time, the egg does come before the chicken.

It is seldom that anyone becomes a writer until he (or she) has been writing for some time. That is why so many authors and writers spring up out of the newspaper business. The day-to-day necessity of writing—of gathering material about which to write—develops their talent, their insight, their background and their confidence as nothing else could.

That is why the Newspaper Institute of America bases its writing instruction on journalism—continuous writing—the training that has produced so many successful authors.

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Many people who *should* be writing become awestruck by fabulous stories about millionaire authors. Therefore they give little thought to the \$25, \$50 and \$100 or more that can often be earned for material that takes little time to write—stories, articles on business, sports, war activities, civilian defense, recipes, etc.—things that can easily be turned out in leisure hours, and often on the impulse of the moment.

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Our unique Writing Aptitude Test tells whether you possess the fundamental qualities necessary to successful writing—acute observation, dramatic instinct, creative imagination, etc. You'll enjoy taking this test. The coupon will bring it, without obligation. Newspaper Institute of America, One Park Avenue, New York 16, N. Y. (Founded 1925)

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NATURE MAGAZINE

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To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and
Devoted to the Practical Conservation of the Great National Resources of America

IN THIS ISSUE

November, 1943.....Vol. 36, No. 9

Camera Trails.....Norris W. Harkness 450

Contents Noted.....R. W. W. 455

Rima, the Capooa.....Ivan T. Sanderson 457

Silver Wedges.....Richard W. Westwood 461

Emblems of the United Nations
Margaret Whittemore 465

Ancient Glass Sponges.....Carroll Lane Fenton 471

Mike, A Prison Mouse.....Raymond Leroy Moseley 472

The Lure of Succulents.....Ruth Hodgson 473

Farallon Cormorants.....Lee Passmore 476

Mrs. Katt and Family.....Edwards H. Smith 478

Wild Turkey Blitz.....Frank Clodfelter 480

As We See It.....481

Nature in Print.....Howard Zahniser 482

Tree Rings for Victory.....Erick B. Davis 483

The Perfect Hobby.....Paul W. Churcher 485

The Return of Orion (Poem)
William Colfax Graves 486

Early Terrors of the Deep.....Elsie A. Parry 487

The Polar Skies.....Isabel M. Lewis 491

The Leonids (Poem).....Margaret S. Hosmer 492

The School Page.....E. Laurence Palmer 493

Under the Microscope.....Julian D. Corrington 502

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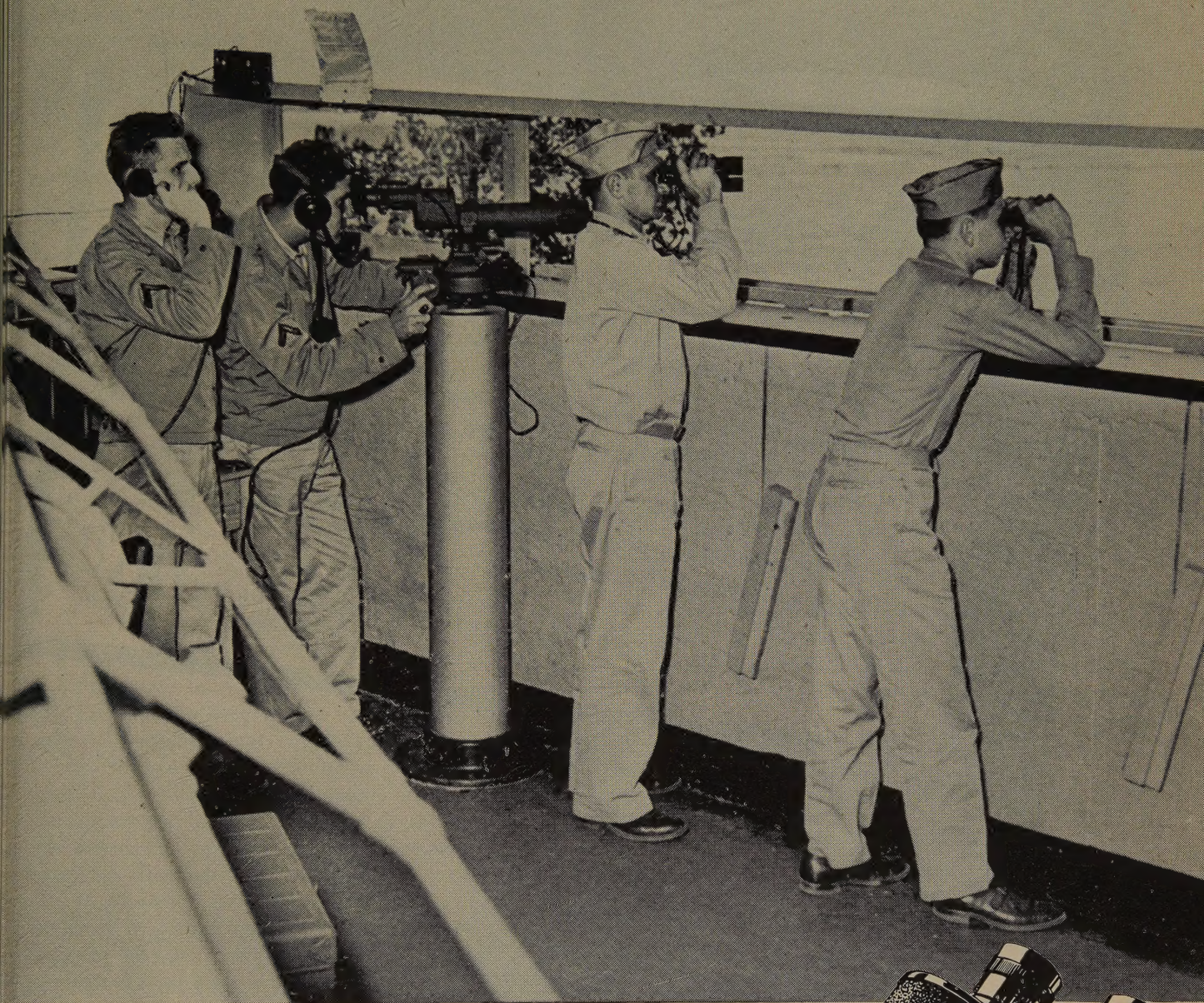
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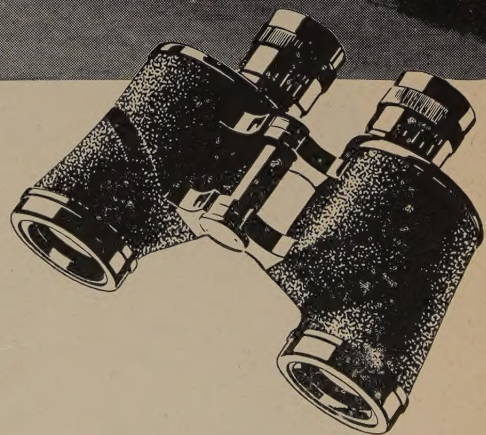
"She doesn't answer

Fire a shot across her bow"



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I take more drastic action. Such de-
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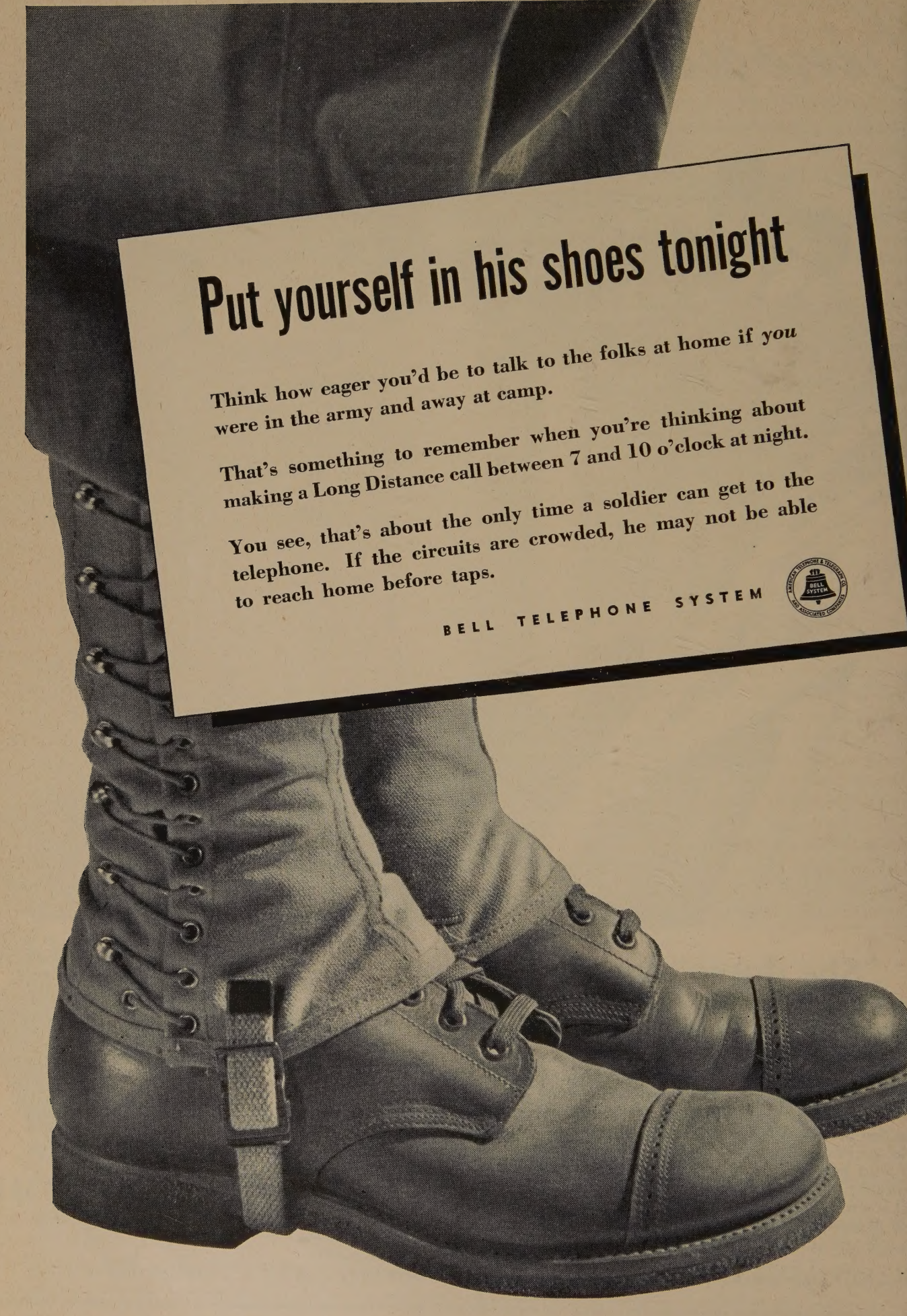
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You see, that's about the only time a soldier can get to the telephone. If the circuits are crowded, he may not be able to reach home before taps.

BELL TELEPHONE SYSTEM



Contents Noted

Eleven million, six hundred thousand five hundred and eight-five mallards, 898,988 baldpates and 834,878 coots checked in for food and rest at Federal migratory waterfowl refuges during the fall migration of 1942. Whistling swans to the number of 62,124 made refuges whistle stops. So says the U. S. Fish and Wildlife Service, thus conjuring up a picture of the job we would like to have—lying on our backs in the cooling rays of the autumnal sun, softened by the blue haze of the fading year, just counting. Duck after duck; goose after goose; swan after swan—the mere thought of it is soporific. We are afraid, however, that we would always live with the fear that there might have been 898,986 baldpates, or an even 899,000. And we would always wonder whether the boys at the next refuge along the flyway might be counting our baldpates over again. It is all right, Dr. Gabrielson, we will take your word for “more than twenty-five million” visitors, although there must have been repeaters, but shoo the office boy away from the adding machine and let us settle for “a lot of ducks,” or “not enough birds,” as the case may be.



New Jersey, in common with other eastern states, finds its multi-million-dollar highways lined with a variety of roadside enterprises and billboards—most of the former closed; the latter proclaiming their wares to the comparatively empty air. Noting this, the Governor, State Highway Commissioner, and people interested in roadside improvement and safe travel on the highways—as we are—see an opportunity to remedy a hideous condition with little or no hardship to going concerns. Never was there a better moment to put rural highway zoning in effect throughout the East, which faces a situation that is about as bad as possible.

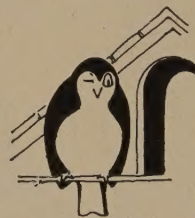


Plant specialists have wrought all manner of miracles with trees, shrubs and plants. They have bred fecundity, strength and greater values into them. They have created new fruits and berries, and the like. But somehow they have never done anything about the sugar maple, which is harvested about as it was when the Indians taught the Pilgrims. At the University of New Hampshire's Agricultural Experiment Station, Professors Stevens and Dunn, forester and plant physiologist respectively, have set out to do something. Spurred by the often-heard report of

“sweet” trees that produce a higher per cent of sugar than others, Professor Stevens is seeking out these trees to see whether a strain can be developed, and to find out what might account for such trees being as they are. Complementing this hunt, Professor Dunn is seeking better methods of rooting sprouts, which is not easy with hardwood trees. They hope for an orchard future of high-test sugar trees for a nation whose sweet tooth has not been getting its usual attention of late.



We like both the name and the idea that lies behind the Bluebird Trail—more prosaically known as Route 13—across Missouri. According to the latest report we have, 6250 bluebird houses have been put up along the environs of this highway, and a coast-to-coast Bluebird Trail is envisaged. It all started when Mrs. Erle R. Jackson of Kirkwood, Missouri, woke up in the middle of the night with the idea that something more should be done for the official State bird than just a legislative resolution. She was on the telephone by breakfast time, and it was not long before the Missouri Federation of Garden Clubs had its member clubs nailing bluebird houses on tree and fence post. It is great being a bluebird in Missouri now—no housing shortage and rent free.



Ragweed is the principal source of the annual misery that besets hay fever sufferers, but it is a pest that is not found on many of the fighting fronts. Ragweeds—there are more than one of them—seem to need fourteen hours of daylight to prosper and set seed. Botanists report that ragweeds are missing from Alaska, the British Isles, Scandinavia, Holland, North Africa and other spots where our men now find themselves. They are rare or non-existent in the south Pacific regions. Also they are little found in Germany and are alien to Japan. Come on, boys, let's go!



Salute to the State of Michigan, which has a closed season on the wood duck, refusing to go along with Federal regulation permitting a bag of one a day.

R.W.W.



"M'nheer, I need money," said the old man. "I come to sell my capooa. I go home to die on my farm and I must have small money to die with."

Gentle, majestic, devoted, an ideal companion,
she was no ordinary capybara—

Rima, the Capooa

Illustrated by Athos Menaboni

By IVAN T. SANDERSON

"M'NHEER, I need money," said the old man. "I come to sell my capooa. I go home to die on my farm and I must have small money to die with."

He pulled gently on the string and the capooa went to his side. His hand fell to her head. He fondled her ears, her neck, her hard dry muzzle.

"Please," he sang out, "is there man here?"

"Yes, I'm here," I answered, shaking off my inertia, for I had been staring at the old man's eyes, smoky blue in the sunlight, like the whites of plovers' eggs. He was quite blind and had addressed his remarks to the blank kitchen wall.

The old man's head snapped round to face me and he wiped the tears from his eyes with the back of his hand.

The capooa raised her head too and subjected me to a prolonged scrutiny of majestic imperiousness. I had never seen an animal that dared to look a human being directly in the eye, and one, moreover, that continued to look until I was forced to avert my gaze in bewilderment.

"You want to sell your animal?" I asked.

"Yes, M'nheer, I am going home where my sons will care for me and I want money. I have nothing to sell but my capooa and I'm going to die and so don't want her any more."

And so I bought the capooa. I drove the old man to the river wharf where we found his son, for without his capooa the old man could not see and did not know where he was going. All the time he cried softly and without cease, and when he untied the string from his beloved capooa's neck he behaved in a manner that made me turn away and attend energetically to the car. I offered him money and even a job, for one cannot lightly buy an old man's eyes, but he would have it only this way.

By the time I returned to the house the capooa had been named *Rima* by the assembled staff. She stood in the garden at the back of the house in the shade of a tamarind tree and surrounded by poinsettias, un-

moving and unmoved, her heavy-lidded eyes half closed. The choice of her name always remained a mystery, but it was spontaneously agreed upon by the whole staff, who were Dutch colonials.

Rima was a capybara, called a capooa in Surinam. This is a kind of monstrous guinea-pig, three feet long and two feet high at the shoulder. The capybara is an oddity of Nature. It inhabits South America. It is the largest rodent in the world and is often erroneously described as a giant rat. Capybaras are tailless and have bodies not unlike well-fed pigs, clothed in short, coarse, reddish-brown hair. They live in and by the great rivers and are the cleanest of wild creatures. Rima was no exception; she was ultra-fastidious about her person.

The face of a capybara is hard to picture. It is a mixture of guinea-pig, horse and lioness. The muzzle is square and raised haughtily like a caricature of a pompous elderly duchess. The expression is usually

one of extreme Buddhistic serenity. Rima's expression surpassed in regal majesty that of any other capybara, or of any other animal, or even of any human being.

Rima was no ordinary capybara. She had served her ancient and gentle owner as a "seeing-eye" dog serves its sadly afflicted master in our own country. He had brought

her up on his lap since she was no larger than an ordinary guinea-pig. For years, the old man had told me, she had guided him unfalteringly about the little village where he lived and back and forth along the winding jungle trails to his farm and to the river bank, where he boarded the launch to come to the market town. Rima had shared the life of this tired old man, predicting accurately and unfailingly with her small rodent brain his every whim and his every movement, searching out with her lustrous eyes and sensitive nose the safe path that he should tread.

Surely there never was a stranger union between man and beast than between this blind old man and his faithful and companionable gargantuan guinea-pig.

Mr. Sanderson is the author of two delightful books, *Animal Treasure* and *Caribbean Treasure*, based respectively on his explorations in the Cameroons of West Africa and the back country of Jamaica, Haiti, Trinidad and Dutch Guiana. The charm of style that made these works so popular is to be found here in this splendid story of an amazing pet and animal individualist.



"She drove the offending and persistent simian away by the simple process of running him down like a tank and trampling on his long tail."

Hundreds of live animals have passed through our hands. For years our many homes in many lands have been piled with cages filled with the craziest assortment of furred and scaled creatures. They have come to us, frightened wild things, to be fed and examined, to be doctored for their hurts and ills and to be sent on to zoos and museums. Cats, dogs, horses and other four-legged friends have from time to time performed useful duties about us, but all have somehow remained rather impersonal members of our household. Alone among them stands Rima.

The first afternoon of our acquaintance was a little strained. We offered Rima a variety of foods, but her only response was a slow diverting of her gaze, sometimes accompanied by a forty-five degree turn of her head. We were permitted to stroke her hard, bristly back, and her small, rather human ears; we could sit down beside her on the grass and we could speak to her. I emphasize that one was permitted to do these things, but *she*, like Queen Victoria among her Ministers, remained steadfastly *not amused*. One could only retire feeling embarrassed and slightly foolish.

The business of the day continued until sundown and Rima remained beneath the tamarind tree. Her only concession to convention was to sit down and this she did, as she did everything, with the utmost dignity.

The motions this action entailed were performed separately and precisely, and were interspersed with brief intervals for rest and meditation. First, she squatted on her haunches dog fashion. Her tummy was very round and rather soft and it bulged over her feet. Then she slowly lowered her corpulent body to the ground, elbows projecting above her shoulders like a cat. Finally she extended first one then the other foreleg in front of her, thus adopting the attitude of the statuesque lions outside the New York Library. This was always her favorite pose when resting on the porch or under the trees in the garden.

That night we dined in a spacious room on the ground floor in the manner of Dutch colonial houses.

We were entertaining, and my time was fully occupied with trying to perform the duties of a host in three languages. The room was illuminated only by subdued candlelight upon the table so that all else was in comparative darkness and the spaces between the chairs at the table were in deep shadow.

I had temporarily forgotten all about my capybara, for she was then no more than another animal added to our private menagerie—even if she was a strange and arresting personality. When, therefore, I felt a gentle tugging at my right sleeve and looked down to see Rima standing by my side I received a momentary shock of some intensity. Imagine that you look down during dinner to see a three-foot guinea-pig standing at your elbow. The experience is unnerving, to say the least.

It proved too much for the portly Dutch lady on my right. She uttered a curious gurgling sound and sagged into her chair, which fortunately had substantial arm-rests.

A dreadful hush fell over the room as Rima's monstrous head showed above the edge of the table, but in the silence she gave vent to a single, tiny, plaintive squeak, a sound so small that one would have thought it too big for the smallest mouse. My guests had been struck dumb at this Wellsian apparition that had so suddenly and unexpectedly materialized in their midst, but that forlorn little squeak moved them all to the utmost compassion. It was manifest to everybody that this beast, however unreal in appearance, was possessed of a small and very distressed soul.

"Good heavens, the poor thing's hungry" said the Englishman on my left, adding, rather uncertainly, "What on earth is it? I mean, it's real, isn't it?"

In my bewilderment I snatched up the first thing edible that came within my reach. This happened to be a bowl of peanuts and I proffered them in my cupped palm.

They were accepted—not avidly, oh dear! no, but two at a time with the greatest gentility, being taken between the lips as a horse takes lumps of sugar.

Each pair of peanuts required about a minute and a half of busy chewing with a rapid side-to-side motion of the jaws like a rabbit. When swallowed, two more were taken and the chewing process quietly resumed. From then on it was peanuts that formed the closest bond between us. I carried peanuts with me at all times, and in vast quantities, so that my pockets bulged like a laden pack-mule, for my own capacity for peanuts was only a little less than that of Rima.

Rima was a large animal and at the rate at which she ate I would have spent the whole night satisfying her with one round meal. I therefore had to abandon my dinner and my guests and rush into the kitchen to supervise the preparation of a large platter for my new pet. Rima followed me with measured tread and a slightly disdainful expression.

She accepted the dish of vegetarian fare but remained standing over it looking up at my face. She would not eat, and after coaxing by all the methods that I knew I gave up and started back to the dining room. Rima followed me but halted in the doorway. There she remained, looking first at me and then back at the food, until she finally gave another tiny and solitary squeak.

Her meaning was plain enough and from then on I served her meal every evening in the dining room on the righthand side of my chair at eight-fifteen precisely. If I failed to do so, she disdained all sustenance until such times as I rectified the omission. I must, myself, at least handle the plate, otherwise she would simply stand over the food waiting and looking up.

When Rima had obtained her first meal, our dinner proceeded, while she ate methodically and quietly by my side. The Dutch lady regained her composure and the Englishman resumed his meal, but remained silent and significantly abstemious for he had never seen a capybara before and seemed unconvinced of Rima's actual existence in fact.

While drinking my coffee I felt another gentle tug

at my sleeve. Rima had cleaned her platter and was eyeing me. When she had gained my attention she stepped back and tossed her great head like a shying horse. She repeated the motion several times and then uttered another of her little squeaks. Obviously, she wanted something, but the combined reasoning of all of us could not at first fathom what it might be. Enlightenment came when the maid poured a glass of water from a jug.

The splashing sound caught Rima's attention. She pricked her little ears and her big eyes opened wide. She trotted around the table, located the jug in the maid's hand and stood beneath it looking up and tossing her head. She was served, and drank, beside my chair, two large bowls of water.

In fact during our long association there was nothing that Rima did not get once she had set her mind to it. Her needs were simple but her determination great. I never really believed in animal intelligence until I encountered this wonderful beast; I have never since felt a bond of friendship so close to any other living creature. Rima was not just human, she was wellnigh perfection. With the aloofness and independence of a cat, and the devotion and faithfulness of a dog, she combined the clear thinking of an able lawyer and the economy of a water turbine. Whether she had loved her old man I cannot say. Whether she even liked me I will never know, but that we had a perfect understanding unmarred by the least irritation throughout our long companionship, I can state with emphasis.

A few days after Rima came to live with us I was reading curled up in a big leather chair in the salon on the first floor and above the dining room. The ceilings of this fine old Dutch house were high, so that the main staircase was steep. I became vaguely aware of an intermittent thumping somewhere in the house. It went on and on and I had just decided that it was some trick of the water pipes when there was a final thump and someone heaved a deep sigh of

“ . . . she befriended and solemnly mothered a gentle little fawn that was alone in the world of our garden.”



"She tackled the problem in a most sensible way, taking each step in two motions—front feet first with a hop, then hind feet together with another little hop."

relief on the landing outside. On the next instant Rima hove in sight round the curtained doorway, her splayed feet mincing over the thick carpet. She approached my chair, eyed me critically but not unkindly, and then sat down at my feet with some emphasis and with her back towards me. And there she remained until my tea had been served and cleared away.

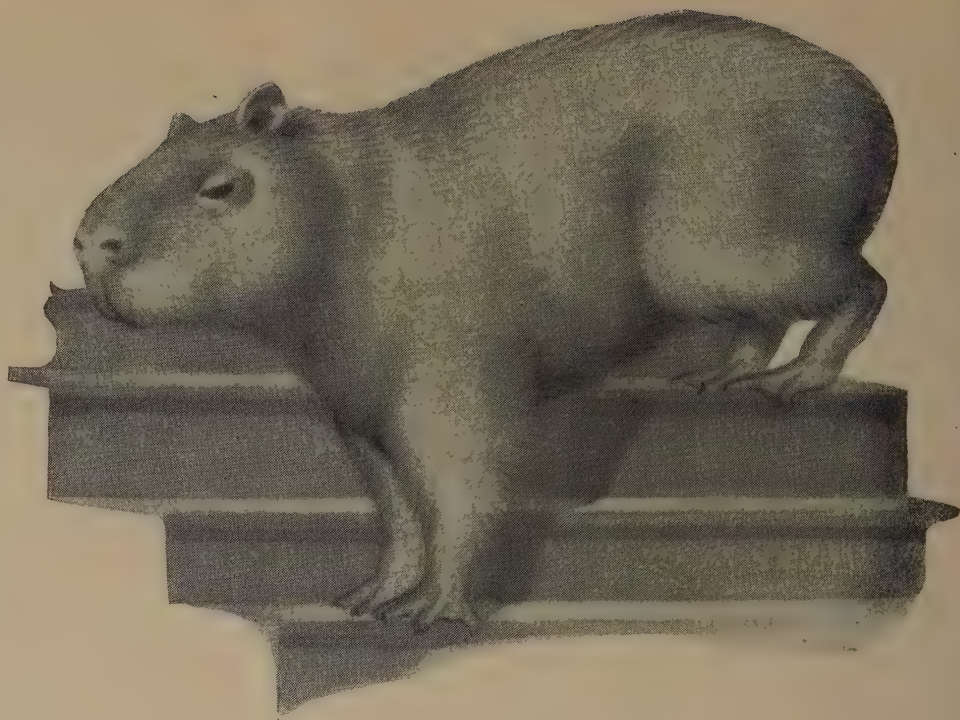
I was interested to see how she would negotiate the stairs on the down trip. The treads were so narrow and steep and Rima was so big and so long. She tackled the problem in a most sensible way, taking each step in two motions—front feet first with a hop, then hind feet together with another little hop. Thus she went down sideways, breathing deeply, like a very young child will do, one foot at a time.

We had a vast open car of considerable age although not undignified, because it was a Rolls-Royce. We used to take drives into the country in the cool of the evening, a much less exhausting procedure than walking about the stuffy town. Rima was no fonder of walking than I, so she came with us in the car. We had to remove the back seat so that she might sit down and still derive the full benefit of the fresh air while observing the scenery. She was so big that, perched on the seat, she towered like an anti-aircraft gun on a flat-car and might have toppled out at sharp corners.

The natives never got used to a white man driving about in an ancient Rolls-Royce accompanied by a guinea-pig seeming somewhat larger than himself.

The colonial Dutch do not believe in bathtubs for the tropics. Instead, they have whole rooms made like shallow swimming tanks containing great vats of water that you ladle out with a monstrous wooden spoon and pour over your shivering person. Our bathroom was on the top floor of the house and had a vast water tank with three concrete steps leading up to it.

One morning water was found dripping through the ceiling of the salon. The fastidious Dutch staff almost lost their phlegm and dashed about with buckets and mops. Then a veritable cascade of water came splashing down the main staircase. We all dashed upstairs to find Rima squatting complacently in the water tank, her haughty chin resting on the concrete and an



expression of ultimate bliss in her half-closed eyes. It took us half an hour to get her out and she had to be carried downstairs by two strong men. A door had to be put on the bathroom.

But do not be misled by these examples of what I can only call liberties taken by Rima. She was fully house trained. Although she had complete freedom of the house and often slept in our bedroom, she always left the room with dignity, proceeded to the garden and retired decorously behind the big water tanks. Once she found this retreat occupied by a spider monkey that was also residing with us and gave her only display of discomposure that I witnessed. She drove the offending and persistent simian away by the simple process of running him down like a tank and then trampling on his long tail.

Although the garden gate stood wide all day, Rima strayed only once. I remain convinced that she only did so in protest at some neglect on my part. We never discovered how she got out because she left after dark when the whole premises were securely locked and as roundly stockaded as a pioneer fortress. like all Dutch houses at night. In the morning she was gone and the whole household was in a ferment. It was noon before reports began to trickle in.

Small boys had been seen throwing mud—fortunately there were no stones in that country—at a fabulous beast that was walking down one of the main streets at dawn. Then a friend rang us from the hotel to say that two young Americans were bidding high in the open market of street vendors and peddlers for an untrue beast that they swore must be a living "d.t.", and which had passed their window that morning. They were affirming that it was a rat, as large as a donkey and distinctly (Continued on page 500)

Silver Wedges

By RICHARD W. WESTWOOD

BILL is a noodle puncher. He stuffs cossettes into a battery with a trident. No, he is not the fellow who puts the quota of noodles in soup, or works in a filling station, or serves as a stand-in for Neptune. Bill is one link in a long chain of workers that extends from the fertile acres of a beet sugar farm to the pure white crystals you get with Ration Coupon Number 14, good until the thirty-first of October.

From which you may gather that this is the story of the sugar beet. It is a surprising, interesting, often exciting tale. But you will have to wait a bit until we get to this business of noodle punching of cossettes with tridents.

Nature has stored many valuable things in an infinite variety of places, setting the stage for an unending global treasure hunt. She has hidden textiles in coal; rubber in weeds; sugar in a grass, a maple tree and a beet. Through the centuries man has followed the clues to this treasure hunting. Meeting with failure and successes, he has sought ways to wrest these great gifts

of Nature from their often obscure hiding places.

Some secrets were learned early; others were elusive or unsuspected. The beet, both red and white, had long served as food for man, and as fodder for his domestic stock. Sugar from the grass known as sugar cane was exploited as early as 500 A. D., but long had been an item only in the diet of the rich. About the start of the Eighteenth Century the presence of sugar in the beet was suspected. It remained for Andreas Marggraf, a German chemist, to prove, in 1747, that Nature had stored in this plant sugar identical with that secreted in the cane. Having established his point, he seems to have left the matter there.

There it rested for forty years, until Franz Achard, one of the chemist's students, set out to extract the sugar. He planted beets and studied their qualities, which were none too good. He came to recognize, after years of work, that the success of the sugar beet industrially depended on breeding high quality into the beet. Yet his little fac-



A contemporary French cartoon lampoons Napoleon's devotion to the sugar beet with the admonition to his infant son, "Suck, my dear, suck, your father says there is sugar in it," while Napoleon sugars his coffee.



Topping the silver wedge by slicing off the leaves with a sharp knife. This picture gives a good idea of the size of the sugar beet. Photograph from the Farm Security Administration.

A beet was developed by mid-century that contained more than double the sucrose percentage of the early, common white sugar beet, forerunner of the 17 to 20 percent types of today.

With all the attention being given the beet in Europe, it was natural that its fame should reach the young republic of the New World. James Pedder, in 1836, and Edward Church, in 1837, became sugar beet "missionaries". Henry Clay was an early "convert". But the first factory was started in Northampton, Massachusetts, by David Lee Child. It lasted a year, its major product—besides 1300 pounds of mediocre sugar—being a book by the unsuccessful proprietor entitled *The Culture of the Beet and the Manufacture of Beet Sugar*. There followed an ill-fated attempt by the Mormons to make themselves self-sufficient in sugar, and several other failures of factories all the way from Maine to California.

The year 1870, however, became important in sugar beet history in this country. At Alvarado, California, E. H. Dyer started a factory. It was nine years before it was profitable, but Dyer stuck to it. It is still in operation. Claus Spreckels built a second successful factory in 1888, at Watsonville, California. These two laid the foundation of an industry that in average years handles ten million tons of beets in eighty-five factories, in seventeen States.

While all this was going on, chemists, agriculturists and nutritionists were finding out new things that related to the sugar beet.

Chemically they had proved that the sugar of commerce is sucrose, with a formula of $C_{12}H_{22}O_{11}$. Whether it is refined from sugar cane, sugar maple or sugar beet, its pure white crystals are identical in composition.

Agriculturally the beet was found to be an all-around asset. It yields sugar, provides valuable stock fodder from the residue after sugar extraction, fits into the crop rotation picture, and enriches the soil when the remains of its deep roots rot there.

Nutritionally we have learned some truths about the energizing value of sugar, and of products, like candy, of which it is a major component.

Finally, when the American people were handed a book of coupons, and

Eighty-five percent of the sugar beet production of the United States is on such irrigated land as this, west of the Mississippi River. Photograph from the U. S. Sugar Beet Association.



tory, underwritten by Frederick Wilhelm III of Prussia and never a commercial success, was forced to work with beets containing far less than half the sucrose in the sugar beet of today.

While Achard was experimenting, one von Koppy was also at work in Silesia. Achard seems to have cooperated with him by supplying seed. Although Achard gave up his factory in 1810, von Koppy went on for ten years, and even afterward continued to improve the beet by selection. Indeed, he seems to have developed the white Silesian beet, "the mother stock of all the sugar beets in the world."

Irked by his dependence for sugar on the British colonies, Napoleon, in a decree in 1811, subsidized factories and ordered that beets be grown extensively in France. He was fortunate in having at his call Philippe Andre de Vilmorin, who, with his brilliant scientist son, Louis, carried on breeding experiments.



Harvesting of the beet crop proceeds so much more rapidly than the beets can be handled by the factories that such sugar beet mountains as this accumulate in factory yards. Photograph from U. S. Sugar Beet Association.

told that they could have just as much sugar as those little rectangles represented, sugar took on a new importance to all members of the household.

All of which is a flying leap through the fascinating history of the sugar beet. There are many books and pamphlets for those who wish to delve more deeply. But we must get on to how Nature and the sugar beet cooperate, and other details of the sugar beet industry, or we will never clear up that noddle-puncher business.

"Crystallized water and sunshine" is an apt description that has been applied to sugar. Certainly it is one of the simplest and most important of foods. Yet, simple as it seems, it still defies the scientist to produce it synthetically. This despite the fact that we have a pretty good *dossier* on how it gets

the way it is; on how it is formed in plants by photosynthesis. Simply stated, what goes on is something like this:

The roots take up tremendous quantities of water from the soil, the moisture moving through the plant as through a wick. It finally goes off into the air through pores, or stomata, in the leaves. Through these same pores carbon dioxide enters the leaf; brings carbon to combine with water moving through the plant. The result is sugar, which is nothing more than water and carbon in chemical combination.

To accumulate organic compounds, through the union of carbon dioxide and water, the sugar plant needs a supply of energy. Sunlight supplies this, and in its presence the synthesis of carbohydrates takes place. Take the sugar out of the plant and put it into the human body and things move in reverse. The sugar is broken down chemically by digestion; the stored energy is released; the carbon leaves the body through the lungs as carbon dioxide; the water departs via the kidneys and the pores in the skin.

One of the greatest converters of solar energy in the plant world is the sugar beet. An acre of beets yields approximately 3500 pounds of pure sugar, not to mention enough by-products to produce 300 pounds of meat to the acre when fed to sheep or cattle.

As with most vegetables

In a sugar beet factory. In the foreground is the cossette conveyor, and the series of vertical white tanks is a group of evaporators where the juice is boiled to a white syrup.



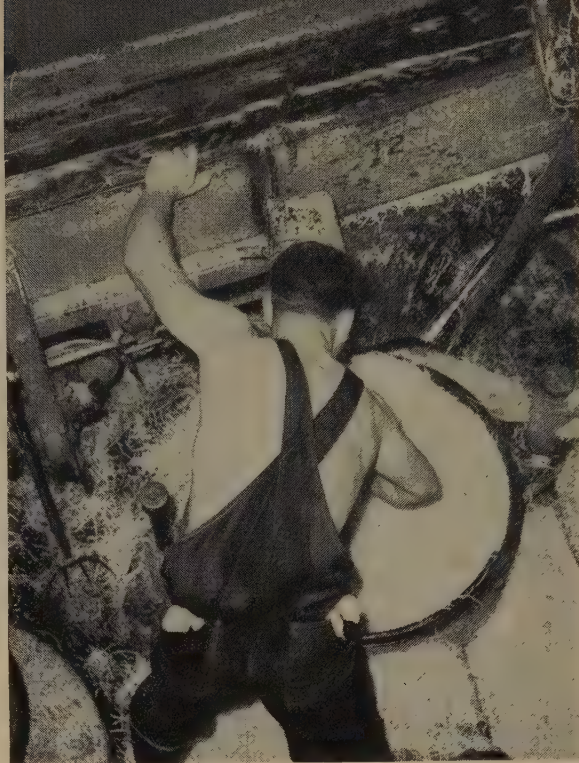
of the farm, the lineage of the sugar beet is a bit confused by the solicitous hand of the plant breeder. It is variety of *Beta vulgaris*, with an imposing family name of Chenopodiaceae. Less formally, it belongs to the goosefoot family. Above the ground the bright-green foliage grows to about fourteen inches; below, the large, tapering silvery - white root looks like an overgrown parsnip. It sends roots six or seven feet deep, plus a network of thousands of lateral roots.

Left to its own devices, the sugar beet is a biennial. Its first season it grows vegetatively, developing in its root a large store of sugar. That is when it is harvested—in mid-life. The second year it would flower and produce seed, but seed production is a specialty of the industry.

Before the first World War most of the sugar beet seed was imported from Europe. In fact, this reliance on foreign sources—principally Germany—left the beet growers in such straits that, before we entered that war, safe conduct had to be negotiated for a shipment of seed. That is changed now; reversed, in fact. Ten years of research, starting in 1923, launched us toward the point of producing all the seed we need, with some left over for those we want to have it.

This was hastened, in part, by a scientific "break." Formerly it was necessary to take up by hand roots destined for seed. These would spend the winter in storage in silos. In the spring they were replanted, and allowed to go to seed. This was costly in labor. Trying to find the answer to poor sugar yields by New Mexican farms, the U. S. Department of Agriculture, working with New Mexico State College, tried plantings every month. They got a surprise when beets planted during September grew well until frost, went to sleep in the ground but did not freeze, woke up in the spring to bolt into seed-bearing stalks instead of going about their normal first-year business of storing sugar. Time and hand labor were saved by these accommodating beets, and the security of the industry was doubly secured.

Seeds were not the only problem. Just as, in racing parlance, there are "horses for tracks," sugar beets have geographical preferences. Their sugar-storing habits varied with where they were put to work. This



A noodle-puncher is at work punching the cossettes, which look like shoestring potatoes, into the diffusion batteries where they start on their way toward reduction to syrup.

was a challenge to scientific agriculture to breed plants for places. It accepted the challenge and won.

Another serious challenge came with the appearance of curly-top and leaf spot, peculiarly American diseases. So scientists set to work to breed resistant varieties. So successful have they been that, for example, the foundation of a factory abandoned in 1924, when curly-top wiped out the local crop, served as the base of a new factory erected in 1937, when the hardy beets became available for that section.

Sowing from fifteen to eighteen pounds of seed to the acre, the beet farmer tries to plant his crop by mid-April. Soon after the

middle of May, if four true leaves have developed, workers go through the fields with hoes, removing blocks of seedlings from the solidly-planted rows. From the remaining bunches all but one plant are thinned. The beet seed is a cluster of cells, each of which may germinate. A recent development, however, is a device that "shears" the seed into single cells. This reduces the need for hand thinning.

By mid-June blocking and thinning have been completed. Weeds are then hoed out and the fields are ready for irrigation. The average plant takes fifteen gallons of water through its system during the growing season, so where rainfall is scarce irrigation is vital. At harvest the root is seventy-five to eighty percent water; the leaves ninety percent.

During August and September the beet puts on most of its weight. By the end of September most of the fields are ready for harvest. The farmer drives the beet lifter through the field, its two blades, moving on either side of the beet rows, loosening the earth and slightly lifting the beet. Field workers, armed with a long broad knife with a hooked end, lift the beet from the ground with a hook, grasp the root with the left hand, and off goes the head of foliage. This operation is, not surprisingly, called "topping."

Striving constantly for further mechanization, the sugar beet industry has developed a harvester that does the lifting and topping in a single operation. However, the demand of war industries for steel and other materials has limited the manufacture of this device, although it holds great promise for the future.

(Continued on page 498)

Birds, mammals, plants, stars and the sun provide symbolism in the—

Emblems of the United Nations

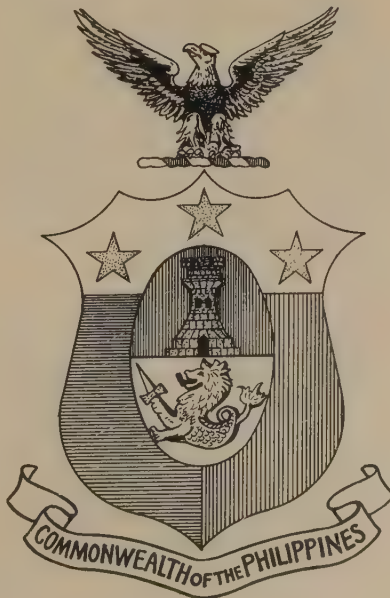
By MARGARET WHITEMORE

NATIONAL emblems go back to remote antiquity—to the time when men first began to form themselves into tribes and clans. Through the centuries, animals and birds have provided important symbolism in these emblems. Among the Egyptians it was customary for each battalion to carry a distinguishing tablet or device indicative of the majesty of the Pharaoh, or typifying some deity. Sometimes it was an arrangement of feathers, a representation of the sacred ibis or other exalted creature. Roman standards were changed with each new conquest, the emperor adopting as his emblem a horse, a bear or a wolf, to be borne aloft on a pole in front of his soldiers. The mainsails of medieval ships were sometimes emblazoned with heraldic designs. Primitive tribes had their totems—figures of birds or animals carrying some religious significance.

When true heraldry began in western Europe it won immediate favor with nobles and kings, who adorned their shields with distinguishing emblems. National coats of arms often combine the personal emblems of rulers with symbols of the authority or composition of the State. The "achievement of arms" consisted usually of a shield, crest, supporters and motto. Many animals found in the armorial bearings of early



The bald eagle was adopted as the national symbol on the Great Seal of the United States in 1782. Holding in its talons a bundle of arrows and an olive branch, the bird proclaims a readiness to fight if need be, but a preference for peace. The coat of arms of the Philippines (below) recognizes the three cultures of the archipelago—native, Spanish and American. The oval shield shows the castle of Castile, and a sea lion of Aragon bearing a hilted sword.



times were taken from the medieval *Bestiary*, a moralized natural history, depending for its popularity upon its conventionalized pictures rather than upon any scientific value. There are copies of the book in the Pierpont Morgan Library in New York City.

The lion is the most common of heraldic charges. The several positions in which they are represented are described by words of French origin, such as *couchant*, *passant*, *rampant*. Unless otherwise specified, they are always represented looking towards the right side of the shield. On more than a third of the coats of arms of the United Nations this noble beast, denoting strength and courage, takes a prominent place. It appears nine times on the national emblem of the

United Kingdom of Great Britain. The earliest English royal seal, that of King Richard I, "the lion-hearted," bears a lion *rampant*. In both the first and fourth quarters of the national shield are three golden lions, *passant guardant*, on a red field, symbolizing England; and in the second quarter a red lion *rampant* on a golden field for Scotland. Supporting the shield are a lion and a unicorn, the latter having been introduced into the arms by James VI of Scotland, when, in 1603, he became James I of England. For about a century before the union of the crowns, two uni-



The emblems of China, the United Kingdom of Great Britain and Russia draw upon Nature respectively for the sun, the lion and the fabled unicorn, and heads of wheat in the rays of the sun, surmounted by a star. Hammer and sickle represent the union of worker and peasant.



Canada's emblem differs little from the Royal arms of Britain. France's fleur-de-lis is added.

corns were borne as supporters of the Scottish royal arms. In the Dominion of Canada the arms adopted in 1921 differ only slightly from the Royal Arms of Great Britain. Here the lion and the unicorn still support the shield, but in the fourth quarter appears the fleur-de-lis of France. As a crest is another lion holding in his right forepaw a red maple leaf for Canada.

In the middle ages stories were widely current regarding the courage of that fabulous animal the unicorn. It was believed that the poison of a serpent could be detected and rendered harmless by this beast; that when the other animals as-



Two of South Africa's animals appear on its arms, plus symbols of four parts of the Union.



The lion holds the flag on New Zealand's emblem, while the shield represents the country's chief industries. Kangaroo and emu hold Australia's shield, which bears symbols of the six Federated States.



sembled at evening to drink, they must await the unicorn to purify the waters that a dragon had envenomed.

The coat of arms of New Zealand, granted in 1911, bears as a crest a lion holding a flag-staff flying the Union Flag of Great Britain. Emblazoned on the shield are symbols of the chief industries of the country—three black ships, a sheaf of wheat, a fleece, and some mining instruments. In addition are stars representing the constellation of the Southern Cross. The supporters consist of a female figure, Zealandia; and a Maori

The badge of India uses the sun motif, which is favored in the emblems of the East.





Latin American emblems avoid suggestion of Old World royalty, as in this Nicaraguan insignia with liberty cap and volcanoes.



Brazil's five-pointed star is in green, for fertility of the soil, and yellow, for mineral wealth.



Costa Rica favors the volcanoes, as other sister republics, and adds other suggestions of the democracy of the New World.

chieftain represents the natives.

Plants and animals indigenous to Australia are depicted on the coat of arms of that continent. The shield is supported by a kangaroo and an emu against a background of golden wattle. The wattle tree, a species of eucalyptus, is grown for its bark, which is used in tanning. Some wattles have tiny golden flowers and others big fluffy ones, "like a newly-hatched duckling," but all full of glory and fragrance. The flora and fauna of Australia hark back to prehistoric ages. Primitive forms, found nowhere else on earth, still thrive there. On the shield of Australia we find the emblems of the six Federated States. For South Australia



The eagle dominates Panama's emblem under an arch of stars, one for each national province.

there is a white-backed piping shrike; for Tasmania, a red lion on a white field; and for Western Australia, the black swan, first discovered on the west coast of Southland.

Supporting the shield of the Union of South Africa are two antelopes—the gemsbok with long sharp horns, and a springbok with curved horns shaped like a lyre as viewed from the front. Quarterings represent various sections of the country—a figure of Hope for Cape Colony; two running black gnus for Natal; an orange tree on an island for the Orange Free State; a silver trek wagon for the Transvaal. The crest is a red lion, his paw resting on a bundle of rods or fasces, symbol

Eagle, cactus and serpent have their places on Mexico's emblem, reflecting an old legend about the founding of Mexico City.



One of the handsomest of all birds, the quetzal, adorns the coat-of-arms of Guatemala.

Volcanoes and the liberty cap of El Salvador are set off by encircling laurel as a symbol of victory, glory and strength in the republic.





Cuba's coat of arms features laurel and myrtle and a bit of the island's scenery dominated by a native palm. Honduras has a complicated emblem with tropical fruits and flowers and other details emphasizing the richness of the country. The Dominican Republic has a simpler design but in it the laurel of victory is again used. These three insignia show graphically the difference between the emblems of the Old World and the New World.

of authority of the government.

The lion as a heraldic device was introduced into the Low Countries about the Twelfth century by Philip, Duke of Flanders. The oldest armorial seal of a sovereign prince, that of Flanders, bears a lion *ram-pant*. A golden lion emblazoned on a black escutcheon forms the shield of the Belgian coat of arms; and the lion in one form or another appears on most of the emblems of the nine provinces comprising the Kingdom of Belgium. The Grand Duchy of Luxemburg has a red double-tailed lion for its emblem.

The emblem of the Netherlands, authorized by Queen Wilhelmina in 1907, shows two lions supporting a shield on which another lion bears in his right claw a Roman sword, and,



Haiti's emblem has the martial touch and draws upon Nature only for some palm leaves.



The great condor spreads its wings atop Bolivia's scenic shield and massed flags, in contrast with the regal emblem of Iraq, (left), which also draws upon Nature for date trees and wheat and cotton branches, while the Babylonian lion and Arab horse hold the shield. Yugoslavia's coat of arms is in the royal manner with the double-headed eagle indicating the union of the Serbs, Croats and Slovenes.

in the left, seven silver darts representing the seven United Provinces. The province of Zeeland has its own coat of arms with the motto, "I struggle and emerge", and the representation of a lion struggling in the ocean.

In accordance with representations on old royal seals of the thirteenth and fourteenth centuries, the lions of both the Netherlands and Norway wear on their brows an open three-leaved crown. Two double-tailed golden lions serve as supporters of the shield of Czechoslovakia. They stand on intertwined branches of the linden tree, national tree of that country. Emblazoned on the shield are a silver lion for Bohemia, a red bear for Carpathian Russia, and eagles for Moravia, Silesia,





On Poland's emblem the white eagle is displayed against a red field, and although Poland is a republic the eagle still wears a crown. Lions are important on the emblem of the Netherlands, which was authorized by Queen Wilhelmina in 1907. Grecian arms bear two figures of Hercules, clad in lion skins.

Tesin and Ratibor.

In popularity the eagle shares honors with the lion as an heraldic device. The Etruscans were the first to adopt this symbol of royal power. In ancient art it was the attribute of Zeus, and was often figured on medals and coins carrying the thunderbolt of the King of Olympus. The emblem of the Roman Republic in the time of Marius was a silver eagle with spreading wings and with claws grasping the thunderbolts. The Persians under Cyrus used as their standard a white flag on which was displayed a golden eagle. This bird appeared on the seal of the King of Ur of the Chaldees, was stamped on certain Mohammedan coins, and emblazoned on the chariots of warriors and the shields of knights.

The form in which this emblem of authority is most frequently employed in heraldry is the eagle *displayed*, with wings extended upwards toward the top of the shield and feet set apart. Another less common form is the eagle with wings *abaisé*, the feathers drooping downwards. The Byzantine emperors adopted the double-headed eagle to symbolize their sovereignty over both the Eastern and Western Empire. The Czar of Russia, as the successor of the Roman Caesars, displayed a black double-headed eagle on his standard. It was first used in 1472, upon the marriage of Czar Ivan the Great of Sophia to a niece of the Byzantine emperor. This



Double-tailed golden lions hold the shield of Czechoslovakia, on which are lion, bear and eagles representing provinces.



Abyssinia's lion, whose emperor is the "Conquering Lion of Judah."

was said to proclaim the authority of the Czar over Asiatic and European Russia. The emblem has been superseded by the arms of the Union of Soviet Socialist Republics—a globe in the rays of the sun, surrounded by heads of wheat, and surmounted by a five-pointed star. A sickle and hammer upon the globe symbolize the union of workers and peasants.

The cities of ancient Greece displayed various devices on their staffs. The Athenians chose the olive and the owl; the Corinthians, a pegasus; the Thebans, a sphinx; and the Dacians, a contorted serpent. The coat of arms of Greece, authorized in 1863, shows a silver cross on a blue field, with the motto, "My strength is my people's love." The shield is supported by two figures of Hercules with clubs and lion skins, symbolizing force and justice.

From ancient times the dragon has been a favorite emblem for standards, especially among eastern nations. The national emblem of China was formerly very complicated, its central element being a hatchet, with a flowery bird on the right and a green dragon on the left. This has been replaced by the emblem of the Kuomintang, the Chinese Nationalist Party, and consists of a white sun having twelve rays set in a blue circle. This stands for radiation of light, freedom and equality.

The double-headed eagle on the state emblem of

Yugoslavia indicates the union of Serbs, Croats and Slovenes into one independent State in 1918. It bears on the breast the arms of these three separate peoples. On the coat of arms of Poland is the form most frequently seen in heraldry—a white eagle displayed against a red field. This emblem was chosen in 1927 by decree of the President of Poland.

It was on June 20, 1782 that the bald eagle was adopted as the national symbol on the Great Seal of the United States of America. It was stamped on the first coin issued by the United States government in 1795, and today its appearance on coins, stamps and state documents signifies governmental authority.

Surmounting the shield of Panama, an Indian name meaning "plenty of fish," is an eagle with outspread wings, holding in its beak a silver streamer. Over its head is an arch of seven golden stars, designating the national provinces of this gateway that joins the two oceans.

In their official arms the Latin American countries generally avoid all suggestions of Old World royalty, introducing instead the Liberty Cap and their national flags. Volcanoes constitute the principal feature in the arms of Nicaragua, El Salvador and Costa Rica. Laurel and myrtle branches are found in the arms of El Salvador, the Dominican Republic, Costa Rica, Cuba, Mexico and Guatemala. In classical art the laurel was sacred to Apollo and the victors in the Pythian games were crowned with this emblem of victory, triumph, glory and strength. Haiti and Cuba show royal palm trees; while Honduras, in addition to tropical fruits and flowers pouring forth from large cornucopias, has groups of pine and oak trees, symbolic of the vigor and rich development of the country.

Brazil's emblem consists of a five-pointed star, each section of which is bisected in green for fertility of the soil and yellow for mineral wealth. Branches of coffee and tobacco plants surrounding it are indicative of the country's agricultural wealth.

The great harpy eagle with crested head, featured on the coat of arms of Mexico, was called by the Aztecs "the



The Norwegian lion holds the hatchet of St. Olaf, patron saint of the land.



Belgium's lion appears on its coat of arms and on those of most of the provinces, while the insignia of Luxemburg (below) features a red, double-tailed lion.



winged wolf"; and its delineation, adopted as the national emblem in 1917, conforms to Aztec pictographs. The eagle, cactus and serpent have been introduced in various forms into the coat of arms both of Mexico and Mexico City. This emblem is based upon an old legend concerning the founding of the capital. While wandering about during the fourteenth century, the Aztecs were told by an oracle that they were to build their city when they found an eagle with a serpent in its talons perched upon a cactus. Coming upon such a combination, they stopped and laid the foundations for a city from which eventually rose the City of Mexico.

In Bolivia, Colombia, and Ecuador, the condor, native to these countries, takes the place that the eagle holds in the heraldry of other nations. One of the largest of flying birds, the condor is found in the Andes from Peru to Patagonia, usually at altitudes of from 9000 to 16,000 feet. It nests on inaccessible ledges of rock and the young are unable to fly until nearly a year old. In flight they exhibit great grace of movement, sailing in immense circles without apparent flapping of the wings. The Bolivian coat of arms includes also symbols of the country's mineral, vegetable and animal wealth. Mount Potasi, where much silver and tin are mined, occupies the center of the shield. In the foreground may be seen a breadfruit tree, a sheaf of wheat and an alpaca. The silky wool from this native sheep-like animal has long been an important article of commerce. Like the llama, the alpaca feeds on the coarse scanty grass and mosses of the higher Andes, and seems incapable of existing on any other food or in any other climate.

One of the handsomest of all birds is the quetzal, which figures prominently in the national emblem of Guatemala. It appears also on stamps and coins of the country. Its plumage is metallic green above and scarlet below, with white tail-feathers three feet in length. Before the Spanish conquest this bird was so highly prized by the natives that no one was allowed to harm it, although the long plumes were sometimes removed for

the adornment of Mayan chiefs. Like other trogons, the quetzal nests in hollow trees high in the jungles. It is a bird of freedom, but survives captivity.

In addition to the coats of arms, some countries have individual badges, such as the red rose for England, the thistle for Scotland, the harp or shamrock for Ireland, and the leek for Wales. These badges are incorporated in the coat of arms of England and also of Canada. Queen Elizabeth adopted the falcon as her badge in memory of her mother, Anne Boleyn, wife of Henry VIII, at whose coronation it was shown.

In the fourth quarter of the Canadian shield is displayed the fleur-de-lis of France. The meaning of this heraldic device has been the subject of much controversy. While usually associated with the royal house of France, it is found also in decorations and carvings of India, Egypt and Etruria. There is a legend to the effect that St. Denis, patron saint of France, personally bestowed the lily upon the royal family, and until the downfall of Louis Philippe in 1848 it appeared on the flag of France. Louis VII is said to have adopted the purple iris for his emblem when starting upon a crusade in 1137. Another writer

says it was the custom of the Franks at the coronation of a king to place in his hand a reed or iris in blossom instead of a sceptre, and this was the origin of the flower as an armorial insignia. Some claim that the name came from the river Lys in Flanders, noted for its yellow iris. The fleur-de-lis assumed different forms at different periods. The type under the reign of St. Louis was slender and graceful in design; that of Louis XIV, broad and heavy. For many centuries the fleur-de-lis was quartered on the royal arms of England in assertion of the claim of the English royal family to the throne of France. It was removed from the shield by George IV.

The salamander, standing in flames or rising unscathed from their midst, was the personal emblem of Francis I of France and was given him by his tutor Boisy. Placed beneath his arms as king of France, it typified triumph over adversity. The eagle, in its flight upward to the sun, was the chosen insignia of Napoleon I, and was indicative of his soaring career, which came to an inglorious end, as will those of the dictators of today against which are massed the peoples of the United Nations, joined in freedom's cause.



Ancient Glass Sponges

By CARROLL LANE FENTON

THE sponge with which you wash your car is the skeleton of an animal. Like many other skeletons, it belongs to an old but unprogressive family. Sponges apparently were the first animals to develop bodies made of many cells. Having accomplished this, they settled down to a quiet, simple life through the ages to come.

No one knows where sponges first lived, or when. But at least a half billion years ago they inhabited a shallow sea that stretched from the Arctic Ocean to southern California. These ancient sponges strengthened their bodies with needles and fibers that looked like spun glass, tangled together in the form of a vase.

Larger sponges, of similar form, live near Japan today.

When the ancient glass sponges died, their soft flesh soon decayed or was eaten by other animals. Their glassy skeletons survived, however, and were buried in mud or sand that slowly hardened into stone. Some-



times the tough skin was preserved, too, forming a wrinkled coat on the skeletons as they became fossils.

The best of those fossils now lie on a high ridge near the town of Field, British Columbia. They were discovered more than thirty years ago by the late Dr. C. D. Walcott, of the Smithsonian Institution. Dr. Walcott collected the specimen shown in this photograph, as well as many other glass sponges and impressions of their skeletons. Yet he did not get all of them, by any means. Collectors who climb the ridge still may pick up good specimens, or find them by splitting slabs of hard, black shale that are scattered over the slope.

Glass sponges also lived in ancient seas of Nevada, Iowa, New York and other regions. Those of New York have been restored in the form of colored models exhibited in the State Museum at Albany. The restorations show both the shapes and the bright hues of the sponges in days when they lived.

Mike, A Prison Mouse

By RAYMOND LEROY MOSELEY

BEES, butterflies, house-flies, cockroaches, snakes, terrapins, birds, cats, ants, snails, rabbits, beetles, gnats, moths, grasshoppers, guppies, frogs—each of these, and more, have had their prison friend and day. It is common to have a prisoner ask the prison librarian for a book on small animals or insects. Chances are that somewhere in this sterile world behind bars, he has found a bit of life to adopt and call his pet. It may be a plant, a young bird, a kitten, a tiny fish, and the prisoner wants to know about feeding, housing, care and treatment.

It is not exactly sentimentality, this willingness to lavish affection on a pet, but rather because all men are lost without channels into which they can divert their finer feelings. In this, men behind the bars are no more lacking than the builders of dog shelters, orphan homes, and wild-life sanctuaries. The extreme measures to which prisoners go is well illustrated by my friend Mike,

a good mouse, as my report of him will surely reveal.

I tricked him on one of his nocturnal visits to my cell. He was always foraging for food, and persisted in waking me from my sleep by rattling the waste paper in a box I keep on the floor. Then he sold his liberty for a peanut, this atom of life with a tail twice as long as his one-inch self. I set a trap for him by tilting a small box on one edge and baiting it with a peanut. When he nibbled the peanut the trap was sprung. He took his captivity with a gnashing of tiny teeth, hissing at me like mad. Indeed, it was several days before he became quiet enough for me to take out. Then he went into a towering rage because he could not poke his way to freedom from the enclosure of my hand. But that was several months ago.

Mike is now a placid and frisky individual. He has become accustomed to me and I to him. Daytimes he spends the hours gamboling on a revolving wheel I constructed inside a cage made of screen-door wire and stored beneath my bunk. Evenings and night-times he is busier than a bee flitting all over the cell.

We share my rations, part of which I take with me from the mess-hall table at evening meal. When

I enter my cell, closing the steel door behind me, Mike is always waiting. He is impatient at times, hardly able to contain himself until I reach beneath the bunk and draw out his cage. I put it on my writing table and open the tiny door. Released, Mike pretends not to notice me but scampers about with his ridiculous wee nose close to the floor like a hound dog. I rattle the piece of paper in which I have

brought scraps of table food, and that is a signal for Mike. Sudden noises startle him almost into convulsions, but the rustling of paper he has come to associate with our evening repast—or, rather, his repast. I never tire of his comical but earnest attack on a piece of food twice or three times as large as himself.

Mike has not the most polite manners in the world. He crawls all over his food before starting to nibble. He crouches when he eats, with his tail held in a direct line behind him. If I touch his tail, he

whips it smartly away but continues eating. He is so small that the tip of my forefinger can almost hide him from view. His eyes see a thousand ways at once and shine with a perpetual beady luster. His energy is endless and vastly out of keeping with his size.

After Mike is fed, I leave him to his own devices. He has been all over the cell a thousand times, but each evening he makes a fresh start and explores every nook and cranny all over again. His curiosity is insatiable. No object or scent holds his interest for very long—just a quick sniff and away he goes, on an erratic and guideless course. He likes to play around on my bunk. He will chew the bindings of the few books in my meager library if I do not shoo him off the table where I keep them. A glass ink container has fascinated Mike for months, probably because its sides are too slippery for him to climb.

I have no way of knowing how old Mike is, nor to what species he may belong. He is just a sliver of life, lured into a semi-friendship with me in response to the strongest hunger in any living thing—food. He does no tricks, is not trained, is neither too grateful nor understanding. Mike is just a good mouse.





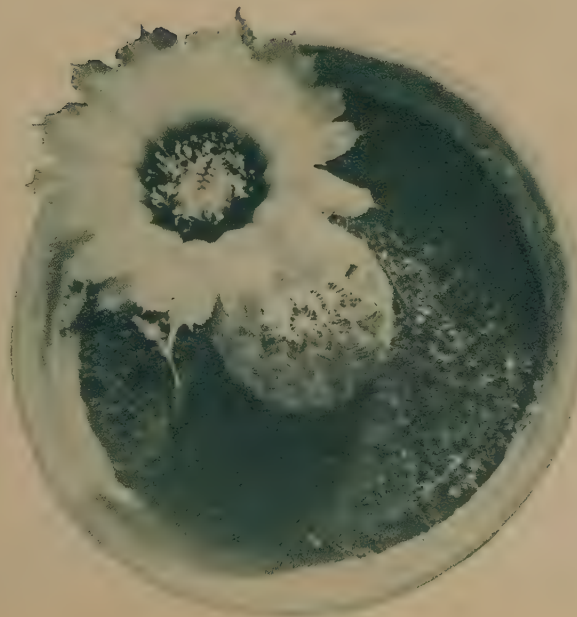
An array of cactuses and succulents that gives an idea of the variety of the interesting plants that the enthusiast may find in this field. A roster of the plants that are shown above would take too much space. Just investigate. At the bottom of the page is *Echinocereus rigidissimus*, valued because of its ethereal bloom, usually coming in April. It is a native of Arizona and commonly called the rainbow cactus. Its blossoms are pale rose and white, and look as though they were made of China silk.

The Lure of Succulents

By RUTH HODGSON

To some, cactuses lack charm; to others they carry fascination to the point of mania. They, and the succulents, are a part of the plant world that many have not seen except in books. More people seem to like succulents because they have no spines and are often beautiful in color and form. To be sure, cactuses are succulents with spines, but for my present purpose I like to make this loose distinction.

It seems to me that one of the charms of these plants is that we wonder



how they can live in the desert, enduring terrific heat, strong, scorching winds and little water. But Nature, with her devices for adaptation, has solved their problems, equipping them to make the most of the scant moisture, absorbing it and storing it as does a camel, and sending down root systems to get all the moisture there is. In other words, Nature has made these plants of the arid regions able to "take it."

There is a large membership among the families of cactuses and succulents



Three charming plants. First, *Echeveria setosa*, or Mexican fire cracker, with small puffy leaves covered with fuzz and always perfect in shape and size. Then is *Epiphyllum latifrons*, with snowy-white blossoms boasting a heavenly perfume. And, right, some echeverias, showing some of the interesting forms of this group.

and anyone specializing in these plants should equip himself with at least one of the several books devoted to their identification and culture. Also, it should be kept in mind that these plants in one's conservatory or home window must be handled in ways different from those in which Nature treats them in their native habitats. Plants growing in small pots and bowls at home need, for example, much more water and attention than those growing in their native desert.

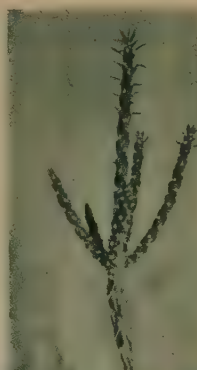
Possibly more with the cactuses and succulents than other wild plants, it is necessary to learn scientific names. In many cases common names are applied by gardeners to several different species that the botanist separates. So forget your feeling that the Latin name is a problem and learn your plants in this field by the official titles that have been given to them. Then, and then only, can you talk intelligently to others who share your enthusiasm for these delightful plants.

In these pages are shown, individually and collectively, a variety of these succulents. Of course, by no such presentation could one hope to more than suggest the interest that is inherent in them. One must know them to appreciate them, and once known, there is no escape from their charm.

One can make only certain general observations. For example, one can say that the euphorbias are easy to raise. They need little care and stand neglect with little outward sign of injury. They grow quite quickly and are

easily propagated by cuttings. But such a general remark is made only to suggest that one should delve more deeply into the subject before making these plants a hobby.

Generally speaking, one may say that these plants grow best in a mixture of one-third leaf mold, one-third sand and one-third garden soil. The cactuses need more sand in the mixture and better drainage than the succulents. Glazed pots are desirable, but if there is no drainage hole, coarse sand and a little charcoal should be put in the bottom of the pot. A little water about once a week is about right under average conditions. In the winter these plants are semi-dormant, and then need less water than in the spring and summer when they are growing. The plants, such as echeverias, that bloom in the winter, need more water at that season.



A log of cholla cactus wood with the top part sawed off, and used as a window box for various desert plants. Such a decorative habitat for these plants seems a particularly appropriate environment.





An interesting plant is *Stapelia peglerae*, left. Its seed pod takes one year to mature and in the picture has just "exploded", spreading its plummy seed. The euphorbias include many interesting species, one of which is *E. lactea*, more startling than attractive. At the right is *Stapelia bicolor*, one of the African natives, odd because it has four points and a square base to its flower star.

Like all plants, it must be said that all succulents will respond to extra care. They are quite heavy feeders and can be given extra food in the spring. Almost any commercial fertilizer serves very well. One should watch the plants that they do not become root-bound and, if this happens, they should be put in larger pots. Unlike some plants, however, they need not be handled gingerly. Tip them out of the pots and carefully crumble the dirt until the roots are clean. If, in doing so, you find a lot of dryish-looking roots that have grown around and around the pot, these should be gently separated from the main live

root and replanted in a larger pot to insure prosperity.

Anyone who enjoys raising plants, whether in the garden, in the rock garden or in the house, may well find cactuses and succulents a field of constant interest and charm. However, one cannot really enter this field hit or miss, but must give a certain amount of study to the subject before hoping for success. Also it is only fair to warn the novice that these plants have in themselves such a great allure that once lost in this horticultural field one is likely never to recover, and really one will not mind this at all. In fact, you will urge friends to follow this hobby.

Euphorbia mammillaria is one of the genus that certainly lacks any particular decorative charm, but its growth breathes of the desert, and it is immediately stamped as a noteworthy plant.





On these two pages Lee Passmore, noted California Nature photographer, whose pictures of insects and spiders have frequently appeared in these pages, gives us some glimpses of the life of the Farallon cormorants that inhabit the Coronado Islands off the California coast, south of San Diego.

The eggs of these birds are rather elongate, oval, light olive-green or pale blue and irregularly covered with brown markings. A lime-like substance covers the eggs, which number from two to six,

with four the usual number in a nest. The cormorants start nesting early in March and continue until late in July.

The seven nests shown below occupied a space of about ten square feet. The owners of the nests flew away at the approach of the photographer, leaving the eggs exposed, a possible feast for the ever-present gulls. In fact, before he had retreated a hundred feet the gulls swooped down and devoured the eggs.

The Farallon cormorants, *Phalacrocorax albociliatus*, breed in





colonies, building their nests on the ground or on rocky ledges high up on the cliffs of the islands. The nests are made of sticks and weed stems, slightly hollowed in the center to hold the eggs. The birds feed on fish, which are obtained by diving. While fishing the cormorant springs a few inches out of the water, then suddenly disappears beneath the surface in pursuit of the fish it has sighted. It swims swiftly and soon overtakes its prey, which is brought to the surface and greedily swallowed. The young are fed by regurgita-

tion until they are able to make fishing expeditions for themselves.

With its skin somewhat wrinkled about the head and neck, but stretched smoothly over its back, the young cormorant shines like a bottle when it breaks its way out of the shell. It is entirely destitute of any covering. The scant lining of feathers in the nest are far from sufficient for the comfort of the young birds, but few as they are, they are certainly better than no feathers at all. Soon, however, a growth of down will cover their bodies, and afford protection.





These half-grown kittens were doing their best to find a way of getting at the chicks in the pen. Although given plenty to eat they are already busily catching mice and frogs and stalking birds. Below one of the kittens makes a useless stalk of a large tame pigeon too wise to be caught.



Mrs. Katt and Family

These two pages will probably bring upon us the wrath of cat lovers. It has happened before when we have presented factual evidence that cats kill song and insect-eating birds, both young and old. Readers have asserted that certainly their cats never did such a thing, intimating that they spend all twenty-four hours of the day and night in the company of their cats.

Be that as it may, down in Rio Hondo, Texas, lives Edwards H. Smith, cat lover and bird lover. He is a gentleman able to stand off and take a completely dispassionate view of the facts. He writes that "Mrs. Katt is a typical predatory house cat of the sort that has a good home, plenty to eat, and is a very tame and lovable animal." She has six kittens. Mr. Smith decided to check up on Mrs. Katt, and to record photographically, so far as possible, what she did in her spare time.

Although she had unlimited milk—the Smiths keep a cow—and a variety of supplementary food, "not a day passes that she does not wander off and shortly come back with a mouse, rat or bird. Her sole idea seems to be to feed them to the kittens, train them, perhaps, for the mice and rats are brought in alive. She dumps her game and walks off. The kittens do the killing and eating."

Mr. Smith says that the kittens have developed into competent mousers, and that he has seen them stalk birds, thus far without success. Mrs. Katt, however, disabused him of the idea that cats do rot and can not catch mature

birds. He has seen her do it repeatedly, once in the case of a curved-billed thrasher. He writes: "She stalked a thick shrub in our yard very carefully. At a distance of about two feet she hurled herself at the bush, hitting it like a half-back charging a football line. She immediately emerged with a dead bird and turned it over to the kittens. She has also brought in three sparrows, one mourning dove and one mockingbird. What she might do in the nesting season I hate to think."

Mrs. Katt is, says Mr. Smith, a valiant mother, tackling a big police dog without fear, and giving a large white tomcat a terrific going over when he came too near.

"There you have it," writes Mr. Smith. "I could no more harm Mrs. Katt than I could a member of the family. I realize that she will probably kill a hundred song birds—possibly young quail—during a year. Also she will get twice that number or more of mice and rats. She has kept us completely free from them at a time when this town has been overrun. It does not seem feasible to confine her. Her hunting range is not more than two hundred yards from where she lives."

Mr. Smith realizes that conservationists know what to do about cats that have been abandoned by thoughtless people and allowed to go wild, or about cats that range far and wide at their killing, but, he asks, "what about Mrs. Katt, who is well behaved, well-thought-of by the neighbors, does not roam far from home, and has a local reputation as a mouser?"

He has decided that there is no need of continuing to gather photographic evidence because Mrs. Katt "gets something every day." Also, he says, "there seem to be several angles to the predatory cat problem."



The day after the upper picture on the opposite page was taken two chicks escaped from the pen. The kittens got them at once and made short work of them. Mrs. Katt brought in this bird to the kittens. The mother did not seem to eat rodents or birds but used them both as food and as training for her offspring, who soon became excellent mousers. The victim here is a sparrow, probably a Henslow's sparrow.



Wild Turkey Blitz

By FRANK
CLODFELTER



Snooping around the Mt. Mitchell wildlife management area in western North Carolina, George Crawford, game protector for the area, had found a wild turkey nest. I scented a picture, so he agreed to take me to the place. We were within a few feet of the nest before I discovered the old lady peering from her well camouflaged position. Confronted with a dark situation, I began setting my view camera up hastily before she departed.

To my surprise and confusion the turkey gave a one-two motion with her feet and pulled a blitzkrieg, turkey style, by dive bombing straight for my head. Raising my arms to protect my eyes I fell backward. I could not legally hit a wild turkey with a game warden looking on, and besides the old hen was too fast. Dissatisfied with her first attack, she turned in mid-air a few feet from my body, then raked my chest with her claws. Then she landed near Crawford—who suddenly ceased laughing—and turned the fury of her attack on him as he ducked through

the laurel. Before I could get the Graflex set for an action shot she dove past my head in another onslaught.

Satisfied with her flogging she rushed back to her nest with a reassuring cluck and for the first time we were able to look at the nest, which contained about six small turkeys and four or five eggs in the process of hatching.

Crawford obligingly kept mamma turkey confused by raking in the leaves back of the nest while I set the view camera on a tripod and made several shots, using a hand held flash to overcome the darkness of the woods.

As We See It



EDUCATION for Victory" has been chosen as the slogan and theme for American Education Week this year. It is, obviously, a timely phrase, and it will, doubtless, serve to dramatize the place of education in the national emergency that confronts us. Yet, if we were selecting the emphatic phrase, it would be "Visit Your Schools." And we would keep on using it the year around.

In wartime it is tragically easy to lose a sense of values. Billions are poured into the bottomless sea of destruction. Taxes soar and politicians are importuned to cut non-essentials. In such times it seems that the schools and the educational system are the first victims of a false economy. To adopt such a course is to indulge in supreme sophistry; to breed termites in the very foundations of the structure of life and of thought for which we fight.

We hear much about the Four Freedoms that are to be assured to all, from the Bushmen of Australia to the Eskimos of Arctic wastes. Yet there is a Fifth Freedom that is fundamental to them all—the Freedom of Free Education. It is the freedom to prepare to enjoy the other four, in a free country under a system of free enterprise.

We have achieved a measure of success in this direction. That it is not enough is revealed by the draft records of illiteracy; by the thousands of teachers who find spot-welding and stenography far more lucrative than the vital work of instructing future American citizens. We read the record of the below-subsistence wages paid to teachers in many States. We discover the niggardly funds doled out to many school systems. We find, if we are honest with ourselves, that we are in a very poor position to pose before the world as knowing all the answers.

The fault does not lie with the school system, however we might differ with some details of it. Nor does it lie alone with the bureaucrats and politicians. It is the American people themselves who are to blame. Too many of them have been failures as parents. They have taken the schools for granted.

They have been too indifferent, too lazy, or too inhibited to cooperate with the school and the teacher to see that their children get the most out of the educational opportunities offered them.

We have lived in a community of average Americans of good education and at least adequate means. Yet, in twelve years of rather close association with the elementary, junior high and high schools—as a parent—we know that not more than twenty-five per cent of the parents indicate more than slight interest in what goes on in the schools their children attend.

If such a situation exists generally—and we have no reason to doubt that it does—we are confronted with a dangerous condition. If the majority of the people appreciate the needs and problems of the schools, those needs will be met out of the public pocket, and the problems will be intelligently solved. If we let things drift by our indifference, our children will be half-educated. Or, worse, our schools could, by public neglect, fall into the hands of evil indoctrinators. We have only to look at Nazi Germany and

Japan to see the danger of perversion of education—and to see the frightening strength of a generation of youth whose minds have been squeezed into a sinister ideological mould.

It is for these reasons that we would emphasize the phrase, "Visit Your Schools." Learn the problems that confront the teacher of your children—problems possibly caused in part by some parental lack of your own. Acquaint yourself with the processes of education today—they have changed with the recent years. Then exercise your rights as a citizen of a democratic form of government to see that your schools are properly equipped, their administrators and teachers properly paid, and your children assured the Freedom of Free Education. This, we believe, is education for victory, and, more important, for the peace that will follow victory. Indeed, it is not too early to consider a slogan "Education for Peace," for permanent peace rests heavily upon strong education.



Nature in Print

By HOWARD ZAHNISER

LOOKING forward to the observance of Children's Book Week in the fall of 1942, this writer's favorite author—which is a frank rather than conceited synonym for the personal pronoun—found it necessary to criticize the war-centered themes suggested by the Week's sponsors and to emphasize a "caution against engaging children in the war-time horrors of their elders."

"The caution," he wrote, "is this: If the book a child reads and the pictures he admires are to make an abiding contribution to his living, they should deal as far as possible with those fundamental realities that are sure to be a part of whatever world his elders may bequeath to his manhood. No group of books seems to meet this requirement more fully than those which deal with the plant and animal life of the earth and the character of the universe in which they live. On the other hand no group seems so inconsistent with such an ideal as those that deal with the ways in which a particular generation solves its problems of war and peace."

How much encouraged this writer, and those who have similar convictions, should be in this fall of 1943 is apparent in the fact that the sponsors of Children's Book Week this year have not only adopted the hopeful slogan "Build the Future with Books," but have also tried "to stress the value of an intelligent and happy individual growth."

Says a release to editors from the Children's Book Week Headquarters at 62 West 45th Street, New York 19, N. Y.: "Children can not be isolated from the facts of war, but books can prove a stabilizing influence. Books about our institutions and the men who founded them inspire an appreciation of our great heritage. Books about other lands encourage an understanding and respect for members of the nations and races of our world. Stories of imagination and beauty help to counterbalance the horrors of war and inspire the child with the sense of faith, courage, and fair play so essential for the better world toward which we strive."

A "Manual of Suggestions" is being issued free to 25,000 teachers, librarians, program chairmen, editors, broadcasters, and other supporters of Children's Book Week. This manual includes suggestions for individuals, clubs and groups, teachers and school

librarians, public librarians and booksellers, and describes the aids that are available at a nominal cost. It invites all groups to co-operate and make Children's Book Week a community effort using all available resources of the local press and radio.

Readers of this magazine will surely welcome such an invitation, and fortunately they will find newly-published works as well as old favorites that serve their special interests, and at the same time meet the suggestions of the Children's Book Week sponsors.

The Eskimo stories from Alaska that Charles E. Gillham has written down in *Beyond the Clapping Mountains* are, for example, certain to encourage among the eight- to twelve-year-old youngsters, for whom it is intended, "an understanding and respect" for the members of another race—a race for which the author has a deep regard and a high appreciation. "I am proud," he says, "to give you these stories of a people who are little known and understood," a people he characterizes as bright, cheery, intelligent,

resourceful, and honest. Wise, too, he might have added, for these animal tales that Mr. Gillham describes as "a combination of Aesop's Fables and Mother Goose" have a simple wisdom beneath their playful explanations of such wonders as "How Mr. Crane's Eyes Became Blue," "How the Foxes Became Red," and how "Mr. Crow Takes a Wife." It is the same sort of wisdom that gives life-long value to the childhood fables that live in our own literature.

"One never knows what he can do until he tries" is a statement of simple wisdom, but it must come with playful force to the mind of a child who reads it as the last sentence of the Eskimos'

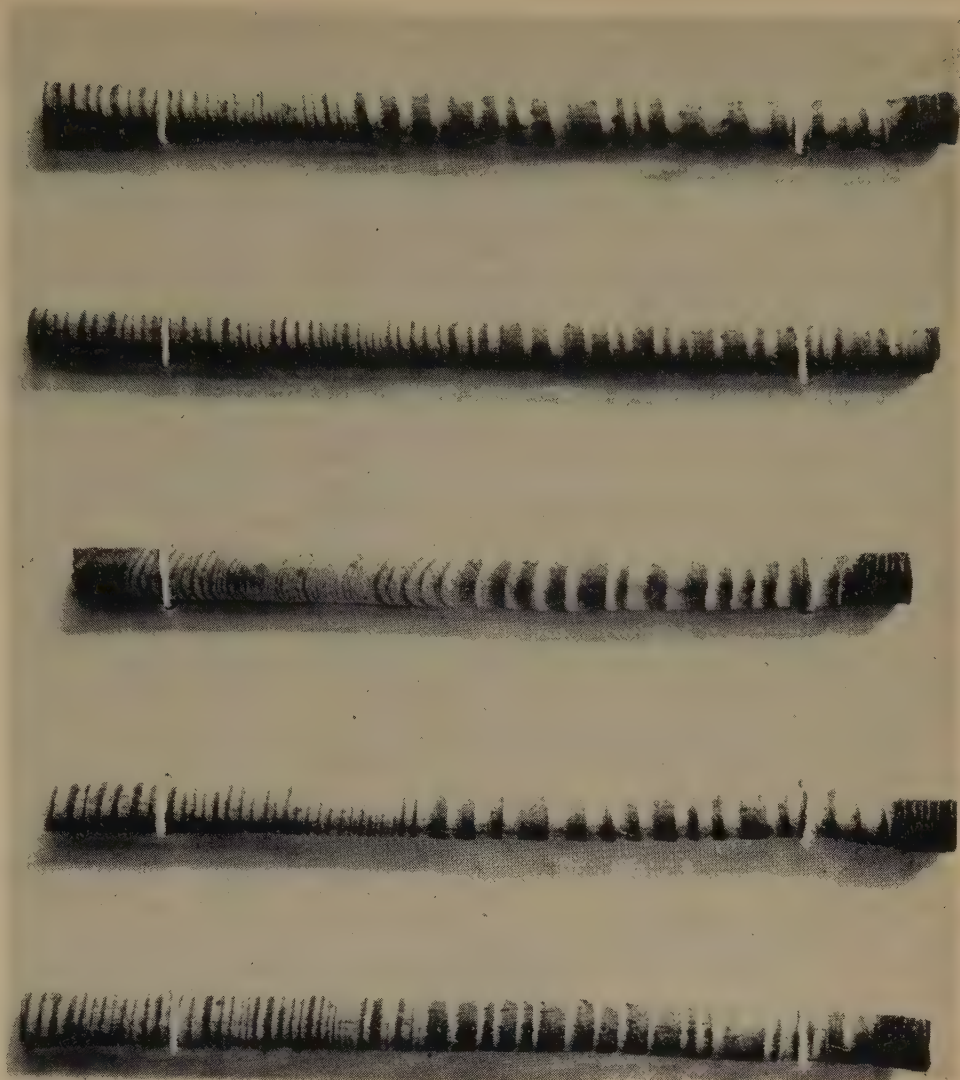
fantastic tale of "How the Ptarmigans Learned to Fly." There is something worth being read in the conclusion of another of these stories: "Mr. Mouse and Mr. Flea had spent too much time together. That is why they had such terrible fights. Short visits make long friends." And the last sentence of the book is: "Kindness is one of the greatest of virtues, and little creatures, especially, appreciate it."

Yet the important thing about *Beyond the Clapping Mountains* is, of course, the fact that the stories are interesting, as also are the ingenuous drawings made for them by the Eskimo girl Chanimun "with an old broken stub pen and a frozen bottle of India ink."

John Y. Beaty has written for still older children a book about America's most famous plant-grower that should, as the sponsors of this week suggest, inspire an appreciation of our heritage—and a part of it of which we are too (Continued on page 496)



These cores are taken from standing longleaf pines left on a large tract from which only trees more than fifteen inches in diameter had been logged. The narrow bands toward the right end of the cores indicate the slow growth of the smaller trees at the time they were in competition with the larger ones that overtopped them. The much wider bands toward the left end show the accelerated growth after the removal of the larger timber, and the increased proportion of summer wood. Thus do tree rings aid in revealing facts of tree growth, among other information. Photographs from the United States Forest Service.



Reading the story locked within a tree, scientists are able to enlist—

Tree Rings for Victory

By ELRICK B. DAVIS

ALLIED scientists have enlisted the American forest industries to provide a body of facts that aid in making long-distance weather forecasting possible. Weather foresight is a strategic necessity of modern war. Massive campaigns of air attack cannot be planned intelligently without as reasonable foreknowledge as is possible of weather for weeks, or even months, ahead. Failure of Nazi forecasters to estimate with practical accuracy the weather of the 1942-43 winter contributed to Hitler's first military defeat. World war demands knowledge of world weather, not only of the moment but of trends, patterns and cycles established through the

years. Past performances are clues to future weather.

Trees record a history of the weather conditions under which they have grown. These cover every year of a tree's life. This may be from ten to fifty years, in the case of production of pulpwood, or a thousand years or more in the case of the giant redwood. Each year of a tree's growth is recorded by a ring. These surround each other in order, year after year, from heart to bark. Analysis of the growth rings tells the tree's history; not only the weather it has gone through, but injuries, attacks of disease, or the years of disastrous forest fires. Since a great fire usually occurs in time of drought, that is weather

history, too, and means something to the student.

Studies of the weather history recorded in the tree growth rings of centuries-old trees show that cycles in the sun's radiation are linked with broad cycles of world weather. It has been established that tree-ring growth expands and contracts in eleven-year cycles in rhythm with the eleven-year cycle of rays from the sun. With this basic information regional variations may be plotted from evidence uncovered by the logger's axe. Weather forecasting, like all science, is founded on the principle that identical conditions produce identical results, and that history tends to repeat itself. The heavy fogs and rainfall of the 1942 summer did not surprise tree-growth ring experts.

Periods of abundant rain in a tree's past mean strong yearly growth and thick tree rings; dry periods, thin rings. It is possible to count back from year to year and see what happened, weatherwise, in some sections of America for generations before white men reached this continent. Correlation of these data with other tree-recorded facts from the rest of the world provide a global weather history that charts a basic pattern of weather "velocity" and trends.

Dr. Florence Hawley of the University of Chicago, uncovering large tree ring areas in the middle West, has brought forth information that aids meteorologists in carrying weather records back to 1318 A. D. She has established, for example, that the United States is not getting any drier; that rainfall cycles exist but that in six hundred years there has been no evident diminution in quantity. She has confirmed that there is no such thing as "American weather." Drought and heavy rainfall may exist at the same time in different regions.

The forest operator, however, does not read tree rings only to find weather data. He collects evidence from tree-ring history as to how best to

grow trees, and the most economic time to harvest them. Now that American forest practice is changing from a "cut out and get out" harvest of the country's primeval forest growth, to sustained-yield "tree farming", in which trees are grown and harvested as a crop, such knowledge is of prime importance to the forest industries.

When a tree is felled, the log ends or the surface of the stump tell a story. But it is not necessary to cross-section a tree to read the rings. The evidence can be taken without endangering a tree's life. Using an instrument called an "Increment Borer," the forest scientist cuts a core from the tree, and draws out a slender pencil of wood that shows the growth rings for all the years of its life.

Much tree-farming knowledge is gained by such study of growth rings. Trees of the same species grow faster at one elevation above sea level than at another, growth-ring study shows. Differing soils provide different growth results, as does average moisture. Where trees of different species grow together in a forest stand, some species "do better" than the others. Best growth is obtained in some cases where all the trees in a stand are of the same species and age. Variety helps trees in other localities. All of these facts forest scientists learn by tree-ring study, using them in operating their "tree-farm" forest lands.

Tree-ring study has even (Continued on page 500)

Using what is known as an increment borer, a forester takes a sample core from a tree in order to read the secrets of growth that the core will reveal.



If one has legs for walking, eyes for seeing, ears for hearing, Nature offers—

The Perfect Hobby

Decoration by Else Bostelmann

By PAUL W. CHURCHER

MOST hobbies are excusable; many are essential. Indeed, one of the foremost rights of individuals is that of spending their unorganized time in some activity other than the one by which they pay for their existence. The fields from which they may choose are unlimited.

Travel is a hobby that, in normal times, is both pleasant and convenient. Far places, new scenes, new ways of living, all hold allure. Collecting is another hobby. To gather things into one place, to garner curios, to accumulate specimens row upon row, is an inclination many of us are born with—and would carry to the grave, if graves were larger.

Travel and collecting both have their weaknesses and pitfalls as hobbies. The other side of the hill is sometimes no better than the one you leave behind. Nor is collecting always pleasant and profitable. One does not constantly get what one is seeking; one is not always satisfied with possession when possession is achieved.

But if you are on the verge of deciding against hobbies entirely, wait a moment. There is one that has all the zest of travel; all the permanence of collecting; none of their liabilities. It has existed through untold years; it will remain when you and I are gone. The broad term for it is Nature.

Nature is everywhere present. It requires no years of training to appreciate, no expensive equipment to be used. It is about us in country and in city, in forest and backyard garden, along winding mountain trail and traffic-laden thoroughfare. If one has legs for walking, eyes for

seeing, ears for hearing, one has access to Nature. A song sparrow sings as sweetly whether you recognize the spotted breast of the songster or not; the slender, dainty, swaying spray of meadow-rue is as delicate even though you cannot call it by its proper name.

Your first introduction to Nature may come in varied ways. When it does, all after that is never quite the same. The experience is something like the time a boy draws his first kite into the sky. It slants up into far space where his hand has never reached

before. With it soars a bright part of his heart. The memory of it lingers, never quite duplicated, never quite forgotten. It will be thus with your first Nature walk. You may not recognize much that lies before you; may wonder at the slimness of yellow birch; the profusion of marsh marigold in a swampy meadow; the boom of a bittern rising from a reed-pierced pool. But little by little you will come to know them; will look for the dogwood's blossoms on the hill-sides; for adder tongue and shy arbutus; will train your ears for ruffed grouse drumming on misty mornings; will strain your eyes to follow the woodcock's courtship dance in the evening sky.

Nature is many things. It is the tonic that takes you out into the open; to the sweep of snow in winter, white across the hills; to April's green and gold October's flame; to a new life that shapes your brain and blood and being. It is an education, full of immediate satisfaction, devoid of later regret. It is the companionship of chickadees in a winter hedge,



the scarlet flash of cardinals in the tree tops, the relaxation of moonlight. It is color and music, history and romance and legend; the green of woodland streams, the amber onrush of rivers in the spring, the brown of a wave-worn beach, the blue of lake and sky. It is the voices of the wind, the thunder of waterfalls. It is the rawness of survival, the majesty of time and immortality. It is all one piece with life, its essence and essential.

Nature is more than the process of creation, it is the source and essence of existence. Eventually the love of it bears fruit, for all else may perish in an individual, but the feeling for that which is Life—the hidden, deep, unconscious pulsing of existence—

if this be loved, somewhat understood, no heart ever can be barren.

If you would have a hobby, try Nature. Whether it be butterflies or leaf patterns; whether it be birds or trees or sunsets, the wind and clouds and sky, the rain and thunder pealing; whether it be the blue-gray mists of morning stirring on some valley's ragged arms, or gulls wheeling where sunlight and white sand stretches; whether it be the drone of insects above the lull of a summer afternoon, the splash of asters in autumn fields, the horizoned trees of winter; whether it be one, or all of these, you will not be disappointed. The lift that will be yours will be never-ending, the value of it will be infinitely above value.



The Return of Orion

A Mt. Wilson Meditation

By WILLIAM COLFAX GRAVES

Hail, brightest, noblest, loveliest of all
 God's constellations, great Orion! I,
 An earth man, welcome you, "The Splendor of
 The Heavens," after vigils Summer long.
 The Pleiades and Hyades, with red
 Aldebaran, foretold your near approach.
 Big Betelguese heaved high his ruddy disc.
 Then, blazing in full panoply, you rose,
 Timed to the dot by Earth's precision gears,
 To rule in majesty the Winter Skies.

* * *

My friend, I've greeted you each Autumn since
 I learned to read the stars. Aeons old,
 Revered by both the savage and the seer,
 Scanned from the banks of Indus, Tigris, Nile;
 Observed by Arab nomads, true storm guide
 Of Palinurus as he sailed the ships
 Of Troy's Aeneas to Lucanian shores,
 Known to the prophet Amos and to Job,
 The mentor of Essenes intent to learn
 That Life in mortal flesh immortal is,
 Beheld by three wise men when following
 The star in eastern skies to Bethlehem,
 Delight of sixty generations since—
 Look kindly on our little sun and on
 Our tiny earth, now opulent with trees
 Turned red and gold, ripe fruits and corn and wine.

* * *

The Harvest Home is our Thanksgiving fete,
 My gratitude to you for hope and faith.
 Of loved ones nearly all have crossed the Styx.
 My friends of yesteryear? Gone, too, alas!
 But you, a symbol of proved permanence
 To men bewildered in this changeful world,
 Bright beacon in the darkest night, shine on,
 O Light Eternal, in my Wintry Skies!

Exquilita & magno
aliquot mensium pe-
riculo lustrata et
iam resecta Freti
Magellanicı Facies.

*Eigentlike afbeeldinghe der Magella-
nische Strate die nu met veel gevaers
ettelike Maenden doorsien, van
nieuw ondeckt is.*

Early Terrors of the Deep

By ELSIE A. PARRY

THE navigator of a *Flying Fort-ress* would be flabbergasted—with reason—if he found the sky areas of his charts decorated with birds of all sorts. He would wonder—again with reason—just what ailed the fanciful map-maker! But in the early days of maps the navigators of caravel and carrack were quite used to the sight of queer sea creatures disporting themselves in the wide open ocean reaches of their charts. Contemporary cartographers had a hearty dislike of empty spaces, and, besides, the creatures they drew lent piquancy to a map. They must have lent terror as well to the superstitious and ignorant mariners venturing into unknown waters.

Early map-makers were, perforce, men of imagination. Most of them had never seen the shores whose outlines they set down on their maps, or the fabulous monsters they drew in such solemn—and inaccurate—detail. All they had to go by were travelers' tales by word of mouth—and you know what proportions fish stories can take on even today!—or written

accounts that were hardly less fantastic. Where details were lacking, the map-makers simply drew upon their own ideas. The results, to a modern investigator,

Sea-lions from the Straits of Magellan with some curious anatomical variations. The luxuriant mane may have been translated into the mermaid's flowing tresses, although these animals are not believed to be the source of the original mermaid idea. From *L'Atlas ou Meditations Cosmographique de la Fabrique du Monde*. Mercatoris.

*Deze Eijlanden die in gheene Pascaerten aengeteecken
den en worden, Liggen van d'incomste der Strate M.
O.N.O verscheijden 50 mijlen op de hoochde van 51.*



are often biologically incredible, and always highly diverting.

The travelers who returned from perilous journeys into the unknown can be forgiven the "tall-tale" quality of their descriptions. After all, what satisfaction was there in braving the "perils of the deep" unless one could come back with sagas to turn the stay-at-homes pale with vicarious terror? The California sea-lion is a harmless and entertaining mammal, but to the shipwrecked mariner, who in 1735 journeyed overland from the Gulf of Honduras to the "Great South Sea" (probably to the coast of Salvador), the one he encountered was something to write home about:

"As I sat in the Tree, my Habitation, I saw a Creature come on Shore on a sandy Bay of the Sea, about a Musket-shot from me; the upper Part of which was somewhat like a Horse, the Head, Neck, and Part of the Body being shaped like the same Parts of that noble Creature, but the hind Part was in the Nature of a Fish. It had flat Feet, with which it waddled along the Shore. This Creature seemed to me as big as any four Horses put together."

Small wonder that a map-maker, faced with such an overpowering description—as big as four horses, no less!—would be inclined to draw a creature of nightmarish shape and size for the delectation of the map-using public.

The little flying-fish that skim so briskly from wave top to wave top so impressed early voyagers to tropical waters that they endowed these aquatic gliders with terrifying proportions. When fish of such size start hurtling through the air, mast-high, discretion suggests that it is time to make tracks for the tall

timber! Actually *Exocoetus* seldom is a foot long.

When it came to really large sea creatures like the whales, the early chroniclers and cartographers did themselves proud. They were not content to let a whale's naturally impressive dimensions tell their own story; instead, they added ferocity to magnitude. The results were calculated to make a landlubber shake in his boots. Pictures of tremendous whales attacking good-sized vessels with bloodthirsty ardor are common on old maps. "It often falleth out," wrote Sebastian Munster in his *Cosmography*, "that Mariners thinking the Whales to be Islands, and casting out Ankers upon their Backs, are often in danger of drowning." Whales were known to heave ships clear of the water by bumping their backs beneath them; whales engulfed ship and sailors in a kind of tidal wave. Good stories, all, but mighty poor publicity for an ocean trip!

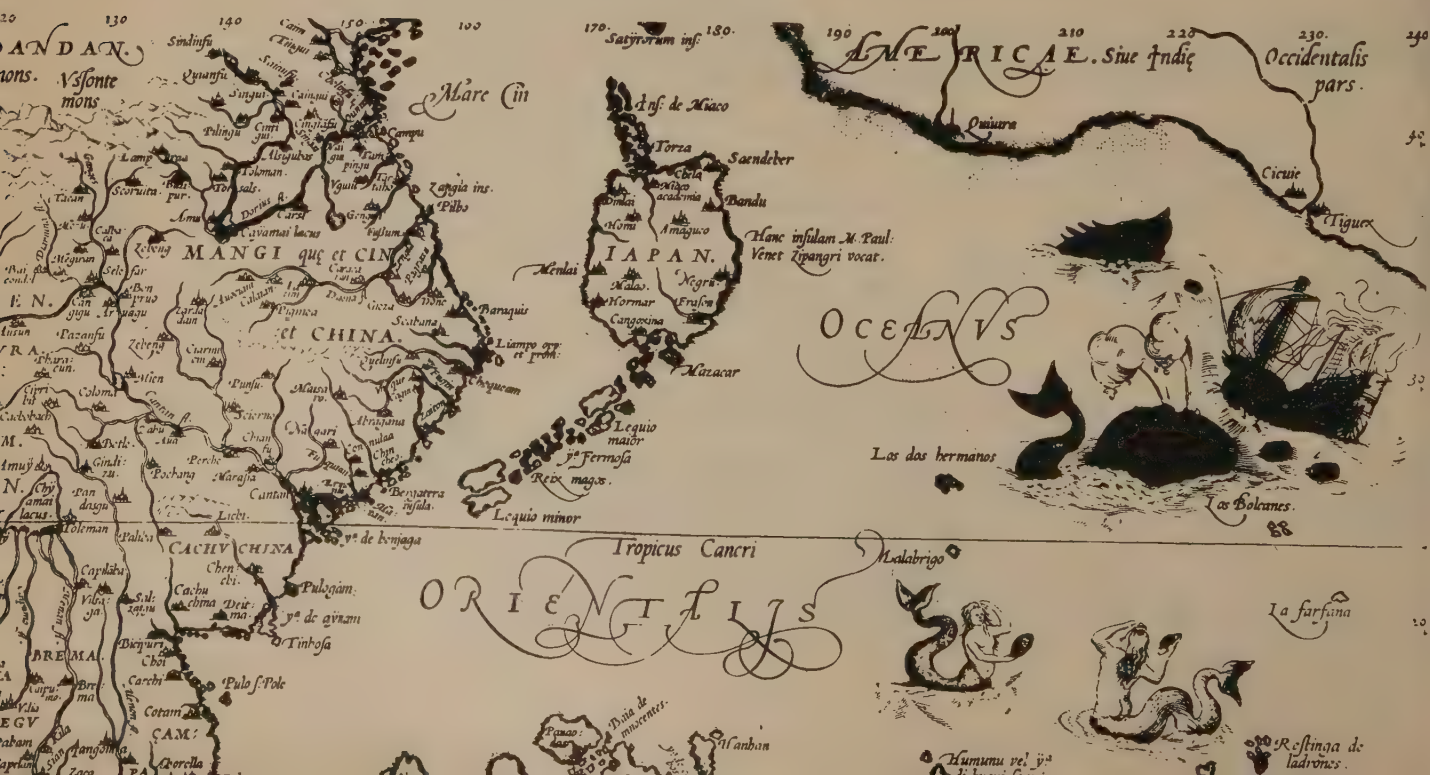
Incidentally, the whales, and with them the seals and sea-lions and assorted dolphins, were all thought to be "fish." "Whale-fish" is a common term. In the *Atlas Geographus* (1711-1717) there is a description of the "Unicorn Fish":

"He has no Fin on his Back, but a Spout-Hole in his Neck. When they swim swiftly, they say they hold up their Horns, or rather Teeth, out of the Water and go in great Shoals. They are shap'd like a Seal. . . ."

This, of course, is the narwhal. In the *Mundus Mirabilis* of Everhardi (1687) his "horn" is described in more detail:

"The Horn of this Seahorse (!) was quite ten Feet long, very heavy, wound like a Snail and as thick as the thickest Arm of a Man, pointed from the Head to

Here a whale is doing up a ship off the coast of America, with another horrendous inhabitant of the sea just waiting to get in on the kill. Below them two vain mermaids admire their beauty in the South Seas. From *Typus Orbis Terrarum*. Ortelius, 1584.



the Tip, which was as sharp as a Needle." Beware!
 Off the coast of Chile, according to the *Mundus Mirabilis*, was found "another admirable Sort call'd the Lion-Fish in great abundance. They are very good to eat, but hard to take unless they be shot in the Head or Stomach. They are as big as a Colt, and have a Lion's Head with a Mane, which the Females have not, nor are above half so big, and have a thinner Skin." This is probably the Patagonian sea-lion.

Off Greenland, mariners met the "Butskopf or Place's Head." This "fish's" head "... is blunt with a Beak of an equal Bigness all along and of a brown Colour marbled. His Fins are like the Dolphin's: His Tail like a Whale's. He has a Spout-Hold above in his Neck, out of which he spouts Water. They are from 16-20 Foot long. His Back brown and his Belly white. They run near the Ships and keep Company with them a long time." Here the inquiring reader has to do a little guess-work. The creature might be a killer whale, a bottle-nose porpoise, or, allowing for a stretch of imagination in the matter of size, a spotted dolphin.

In the early days of ocean exploration the subject of mermaids, and mermen, caused a good deal of wild speculation. Sober descriptions were circulated as bearing every mark of authenticity, and with equal gravity cartographers put mermaids on their maps along with other remarkable ocean inhabitants. In Brazil, according to one chronicler, "mermaids and mermen are altogether of human Shape. They come up to the Bars of the fresh Rivers and several Indians were killed by them. . . . They grasp People so hard, that they crush them to Pieces." In *Mundus Mirabilis* is a description of mermaids seen a hundred miles

from the city of Panama. These were swimming in black water, they were as large as seals, and they sang as sweetly as human beings. Then, as now, travel was certainly an enriching experience!

Scientists, with their usual disregard of the romantic, have tried to run the mermaid legend to earth, or, perhaps more accurately, to sea. The results of their investigations are almost as incredible as the mermaid. They would have us believe that the original of that lovely fish-like maiden with the flowing hair was none other than the manatee. Now the manatee is unquestionably an interesting creature, but by what alchemy of vision could that graceless, seal-like mammal, sluggish of movement and with a face that "only a mother could love," be transformed into a mermaid? The manatee weighs some five hundred clumsy pounds, it has skin an inch thick (formerly "used by the West Indians in Thongs for punishing their Slaves"), and both lips "are supplied with short, stiff bristles."

Some of the early travelers to the east coast of South America were well acquainted with the manatee, although by another name. One wrote:

"The Ox-Fish, so called because it has a hairy Skin, Ears, Tongue, and Cheeks which resemble those of an Ox. The Eyes are but small in proportion to the Body. It shuts, and opens its Eye-lids at Pleasure and often rises to the top of the Water to breathe, in both which it differs from all other Fish. Its Body is very large and its Hair yellow. It has two Arms, each a Cubit (18-22 inches) long and two Hands with five Fingers apiece, and on each a Nail like that of a Man. It has no Fin and resembles a Fish most in the Tail, which is round and firm. In its Head are found two

On this Mercator map there appears, off the coast of America, a fairly accurate engraving of a leaping dolphin, but in the upper right hand corner is a fish designed, undoubtedly, to terrify the beholder. From *Mappemonde*. Mercator, Duisbourg, 1569.



great white and heavy Stones, the Powder of which drunk in Wine or Water, is reckoned the best Remedy in the World for the Stone. . . . The Flesh resembles Beef and is as good as the Best, which occasioned a dispute among the Portuguese, whether it was lawful to eat it on Fish-Days."

Of course, the manatee is not a fish, the "stones" are probably nothing more remarkable than the ear-drums, but at least the creature is described with reasonable—and prosaic—accuracy. Perhaps that was the trouble, it was too prosaic. No publicity-appeal! Hence some enterprising cartographer decided to embellish as he drew. And the mermaid came into being.

Not only did the map-makers give pictorial form to newly-discovered inhabitants of the deep; they were responsible, also, for helping to perpetuate many astounding legends. Their engravings lent verisimilitude even to the unbelievable. A case in point is the remora.

The remora is an interesting fish in its own right. By means of the laminae of its sucktorial disk it can attach itself to a shark, or other marine animal, or to floating objects—a sort of marine hitch-hiker. Astute fishermen in different parts of the world still use this fish to catch turtles. But its structural peculiarity can hardly account for the persistent and astonishing legend connected with the remora: that the fish could halt a sailing vessel running before a full wind simply by attaching itself to the ship, and, presumably, backing water or swimming in the opposite direction.

Of course this is fantastic, but sixteenth century travelers and map-makers did not originate the story. It was already an authentic bit of marine lore in Pliny's time. On the *Mappemonde* of Sebastian Cabot (15—) there appears not only a drawing of the remora (unattached, however), but also an account of its prowess. It could stop a ship despite winds and waves and oars and sails "not with any other work except clinging to the deck nor with any other force except only with natural forces, which fish is like slime or mud from the water." The cartographer goes on to say that this information "is found in many clear writings. Which it is not possible to do other than believe."

But what a tax on credulity, especially when one

realizes that the largest of the fishes are barely three feet long. By the eighteenth century this particular tall-tale began to lose something of its potency. In a *Geographical Grammar* by Pat Gordon (London, 1708) the skeptic gets in a word:

"Upon this coast (Brazil) is frequently seen the Icheneis or Remora, a Fish very famous among the Ancients for its stupendous Power in stopping a Ship (as they imagin'd) though under Sail, and before a brisk Gale of Wind. Which strange Account was generally believ'd for many Ages, and not a few have labour'd to assign the Cause; but it is now lookt upon

as a ridiculous Story, and deservedly exploded by every ordinary Traveler."

Certainly it was a good story. How it came into being originally would make entertaining reading!

Frequently the early travelers are themselves so hazy about the wonders they encountered that their descriptions throw an investigator completely off the track. In 1711 an Englishman visiting the region of La Plata wrote the following in his journal:

"In the marshy grounds toward the Sea, there is often found an amphibious Creature call'd Ao, very like a Sheep, but

has Teeth and Talons like a Tiger." 'Tis reported to be so fierce, that it kills Lions and they often come out of the Water in Flocks and do much Mischief. Travelers have no Way to escape them but by climbing up Trees, and sometimes they either root up the Trees, or stay so long about them that Fear and Hunger make the People drop off."

This is not an alligator; that reptile had been adequately and accurately described elsewhere in the same book. It is not a sea-lion, certainly, because even a befuddled observer would hardly confuse that swimmer with a sheep. It is, according to the best knowledge of two experienced modern naturalists, a peccary! The habitat fits, the disposition and general dimensions fit, but the peccary can hardly be considered an amphibian despite its mud-rooting proclivities. Yet how far afield an artist might go in trying to picture the creature from the Englishman's description. The short-tempered wild pig might conceivably appear with webbed feet!

Marine natural history was to suffer from "exageritis" and inaccurate observation until modern scientific research finally (Continued on page 500)



If one of these giant flying fish were to land in the rowboat, both men and boat would promptly disappear. From *Cosmographie Universelle* by Thevet.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south. Time given is Standard Time; add one hour for War Time.

The Polar Skies

By ISABEL M. LEWIS

IN NO part of the world are conditions more unfavorable for the observations of the heavenly bodies than in the Arctic and Antarctic regions. There are a number of reasons why this is so. Auroral displays are magnificent in high latitudes of both the northern and southern hemispheres, but, like brilliant moonlight, they blot out the light of all but the brightest stars. Such displays are frequent and of great intensity, particularly during sunspot maximum periods. Observatories have been established in high latitudes—notably in Norway and Alaska—to specialize in research work having to do with the nature and cause of auroral displays and to study the ionosphere and magnetic disturbances in general. Interesting and valuable observations have been made in the field of terrestrial magnetism in the vicinity of the north and south magnetic poles, and throughout

these regions. Here the compass needle may behave in a most erratic manner under the influence of some great magnetic disturbance, or as it is carried from one side to the other of the magnetic pole. In general, meteorological observations in Polar regions surpass in interest and importance such observations of the heavens as fall to the lot of observatories in lower latitudes.

The great variation in the length of day and night is another disturbing factor in the observation of the stars and planets in such high latitudes. During the summer months, the hours of daylight and twilight may last all night for weeks. Thus one sees little, if anything, of the stars. The brighter planets may appear in the twilight now and then. The nearer one is to the Pole, of course, the worse conditions will be. If the planet is south of the equator it may not be

seen at all near the North Pole although observable in lower latitudes. At the Pole itself the equator lies in the horizon, and the sun is above the horizon from the beginning of spring to the beginning of autumn; below the horizon for the remainder of the year. The polar day is considerably longer than the polar night, however, because of the refraction of the sun's rays by the earth's atmosphere. This lengthens the day at the expense of the night, both at the beginning and end. It brings the sun into view before it has actually risen and keeps it in view after it has actually passed below the horizon. In polar regions, where the sun skirts along the horizon for days in spring and fall, twilight also brightens the night sky for days when the sun itself is only a few degrees below the horizon.

There are, also, more hours of brilliant moonlight in polar regions in winter than there are in lower latitudes. The full moon is always directly opposite to the sun. In summer, when the sun rides high in the sky and the day is much longer than the night, the full moon is low in the sky and follows the course of the sun in winter. In the winter months the reverse is true—the full moon follows the same path across the sky that was followed by the sun in summer and so rides high through the sky and is above the horizon much longer. The higher the latitude on the earth's surface the more noticeable is this difference between the hours of moonlight in summer and in winter. The polar winter is long, but it is brightened by long hours of brilliant moonlight. This has its effect on the visibility of the stars, however, blotting out the light of all the fainter stars.

In polar regions, especially in the lands where storms are bred, there are many more nights of poor seeing, or no seeing at all, than there are in the temperate zones or in equatorial regions. There are nights when blizzards rage and skies are completely blotted out. There are clear and cold nights when a snow-covered land is bathed in brilliant moonlight dimming the stars. There are nights when auroral displays are so intense and cover so great a part of the sky that the stars and constellations take secondary place in importance. There are periods in summer when one sees the midnight sun for days at a time, or twilight spans the brief interval from sunset to sunrise. Then the stars never appear, and the navigator must depend on other means to steer his course.

But, lest we seem to have painted too black a picture of the prospects of star study in far northern or southern lands, one should not forget that in polar regions there are clear moonless nights in winter when the stars scintillate in frosty splendor. Then, in our northern hemisphere, the Great Bear rides high overhead and circles majestically around the Pole-star with a splendor never attained in lower latitudes. In south polar regions, where Polaris and the Great and Little Bears are never seen, and Orion is severed at his Belt, there is no bright star in the immediate vicinity of the pole. But the Southern Cross rides high in the sky as it circles around the

pole without ever passing below the horizon, and Alpha and Beta Centauri serve as brilliant Pointers to the Cross. The Greater and Lesser Magellanic Clouds, and the brilliant star clouds of the southern regions of the Milky Way, add their share to the beauties of the south polar regions, which at favorable times attain a splendor quite comparable to our north polar skies.

There are certain meteorological studies and researches of great

importance for which observatories engaged in such work would be ideally located within the Arctic or Antarctic circles. Yet for the study of the heavenly bodies as it is carried on in lower latitudes one would do well to steer clear of the lands of the aurora and the midnight sun.

The annual shower of the November meteors, The Leonids, may be expected to appear in maximum strength in the early morning hours of November 16, although they may be seen in smaller numbers on the two preceding days at the same hours. The Leonids are so called because their radiant lies within the constellation of Leo. This is located within the group of stars known as The Sickle, and as it does not rise at this time of year until after midnight it will be several hours later—in the hours preceding dawn—that they will be seen to the best advantage. The Leonids are swiftly-moving and a brilliant bluish-green in color because they approach the earth "head-on". Meteors that appear in the early evening hours are, on the contrary, sluggish in motion and reddish in color because they are on the following side of the earth and have to overtake it. Such are the Andromedids, which may appear in small numbers any time between November 16 and 27 from the direction of the constel- (Continued on page 494)

The Leonids

By MARGARET S. HOSMER

November nights when Leonids were falling,
We two star-lovers climbed the silent tower.
Long had we waited, with the slow time crawling
Around the dial to the appointed hour.

Brief broken dreams had been of far orbs glowing.
Now winds blew cold upon the turret stair;
But starry Leo and his meteors flowing
Drew our minds out amid the astral air.

O golden Lion! Kingly constellation!
Your cold stars glittered through the crystal light,
And scattered star-dust for our souls' elation
In meteoric showers of flying light!

The School Page

By E. LAURENCE PALMER

Professor of Rural Education, Cornell University,
and Director of Nature Education, The American
Nature Association

PRIDE AND PREJUDICE

BACK in 1939, in an issue of the *Cornell Rural School Leaflet*, I wrote of the tons of edible flesh of wild fur-bearing animals that were wasted each year. Earlier, William J. Hamilton, Jr. had touched on this subject in his *American Mammals*. I had emphasized the fact that in a single year New York State was wasting as much as 250 tons of delicious muskrat flesh. This was in the days before we counted our red ration tickets.

A year or so after this I gave a broadcast over the radio, repeating this information. The broadcast was quoted in the *New York Times*, *Herald-Tribune* and other papers. A month or so later, Vice-President Wallace and some of his friends were served a luncheon of muskrat, and, according to the reporters present, pronounced it excellent.

Between the time of the reports in the *New York papers* and the blessing of official Washington, my statement was given varied comment in newspapers. Some defended the idea, while others spared no opportunity to ridicule what the "professor" had to say about eating muskrats. These comments reflected so perfectly the conservative attitude towards innovations that they are worth passing on here.

Conservatives Protest

The *Richmond Times-Dispatch* took up the cudgel for the conservatives in the following fashion:

"Meat shortage? Pouf! says the professor. What's better than muskrat chops? Maybe muskrats scamper up and down the streets of Ithaca, but hereabouts the cook would have to organize a small safari to bring enough muskrats for Sunday dinner. Among vegetable substitutes we are missing, the professor lists cowslips, pigweeds, fern fronds (any frond of yours, Professor, is a frond of ours), cattail tassels and the Jerusalem artichoke. If the professor had only listed something handy, like crab grass, of which most of us have plenty right in the backyard, he would have been on firmer ground. As it is, we just can't see Ma running a trap line during the winter for chops de muskrat. In Ithaca, perhaps, but not here".

Unfortunately, when this clipping came to hand from a Farmville, Virginia, friend, it was too late to answer with the quick come-back it deserved. History, through the Wallace luncheon, had provided an effective answer for the *Richmond* editorial writer. There remained a strong temptation to suggest that in Ithaca, Pa usually provided the meat rather than let Ma run a trap line to keep him alive; and from what I remember of the lovely *Richmond* girls, it would seem that they should be entitled to a higher type of gallantry than that suggested. Incidentally, the *Richmonder* missed a whole flotilla of boats in his comments on the vegetable substitutes, and showed that he does not know his own community as well as he should. Cowslips, pigweeds, fern fronds (frondly and

otherwise), cattails and even the Jerusalem artichoke are all native of his state.

Crab Grass as Food

As for the crab grass, he may be missing a bet there, too, because it happens that I have a peck of fine grass clippings that were dried quickly and ground by D. B. Johnstone-Wallace, director of an important British agricultural research agency. This stuff makes excellent cookies that Professor Johnstone-Wallace believes have the nourishing value of milk. Who knows, with all this rationing, in 1944 we may be eating, even in Virginia, some of the very things the *Times-Dispatch* pooh-poohed in 1942. Certain it is that those who know how and where to get substitutes will not be crabbing so much about those food rations as the conservative eaters, who may be so set in their ways that they will not eat an egg that is cooked twenty seconds too long.

The best answer to *Richmond* comment on my suggestion comes from an equally interesting editorial in the *Baltimore Sun*. Under the title, "One Blush, One Boast" we read:

"In a dissertation upon the merits of sassafras tea—and other herbs and simples afforded in abundance by nature and largely ignored by man—Professor E. L. Palmer of Ithaca, N. Y., yesterday told readers of the *New York Times* that:

"Each year in New York State alone we throw away about 250 tons of delicious muskrat flesh, worth in peacetimes about 25 cents a pound in the markets of Baltimore."

"Spare our blushes, professor! Do you know what Baltimore does with that muskrat flesh, or with a considerable part of it? Well, since he probably is in on the know, anyway, we'll come right out with the secret: Baltimore uses muskrat as 'filler' for diamond back terrapin. Diamondbacks are scarce and expensive, the *most expensive food* hereabouts. To pad out the supply, smart Baltimore cooks know what to do and how to do it. Mind you, we do not go so far as to follow the Chicago recipe for rabbit paté, which is fifty-fifty—one rabbit, one horse. All we say is, they do put muskrat in it.

Muskrat as Terrapin

"But having admitted the fact, and blushed decently, we will now go on to add this boast: Whether you call it diamondback terrapin or terrapin with muskrat added, or terrapin-flavored muskrat, the product is something so rich, savory and altogether delicious that nobody need make any excuses for it. For that matter, a plain muskrat stew, the meat simmered a long time in white wine, is a grand dish; and fried muskrat isn't at all bad. For the muskrat (which isn't a rat at all, of course) is clean, vegetarian and succulent and infinitely superior to squirrel or rabbit.

"Should the day ever arrive (Heaven forfend) when muskrat is as scarce as diamondback terrapin, you may be sure the price will be many times 25 cents a pound. Incredible as it now seems: terrapin once was so plentiful in the Chesapeake area that it was a basic item of diet, like cornpone in Georgia. May the time never come when muskrat stew with rabbit "filler" will cost \$6 a plate."

Would it not be fun to go over the expense account of the *Richmond Times-Dispatch* writer and find that he had sometime paid \$6 a plate for good muskrat stew because it happened to have been labeled diamondback terrapin? Anyway, it seems that in

this case one editor has so effectively answered another editor that a third does not need to add his bit.

But why do we have all these prejudices? Why can we not, once and for all, wipe out prejudices, not only against muskrats but against skunks, many common weeds and even against those who may disagree with us.

I remember only too well the adverse criticism I once got in Georgia when I advocated the reasonable protection of skunks and foxes as enemies of destructive mice. You would have thought from what was written about me by the gentleman who wrote the editorial that I was a combination of fox and skunk designing to bring back the things that his granddaddy may have "fit". When I suggested before that Georgia audience that it might not be wise to burn over their forested areas each year, it seemed as though some would have liked to have rammed the biggest long-leaf pine available straight down my throat, or hang me to its highest limb. Yet, a few years later we find concerted programs in that very state directed against fires as an enemy of the young pine plantations that are to supply the world with newsprint and "silk" stockings.

Let us not go off the handle these days at any new suggestion, particularly if it offers a possible solution for a problem that may be serious. If we are not willing to taste muskrat that sells for \$6 a pound when mixed with terrapin in Baltimore, then let us not crab because the red coupons in our ration books do not last long enough. If we do not know whether cattails and pigweeds grow in our state, then let us go easy about saying they are not there when it is suggested that they might offer an adequate substitute for foods to which we are more accustomed.

In the March, 1943 issue of the *Cornell Rural School Leaflet*, Eva Gordon provided suggestions for collecting, identifying and preparing for use on the table more than a hundred common plants and animals abundant in many parts of the country, and yet little used, and rarely, if ever, cultivated.

We need more bulletins of this sort for all parts of the country. Instead of crabbing about a new idea and emphasizing prejudices of any kind, the sane thing to do is to see what there is in the sug-

gestion that may bear on the local situation.

The *Richmond Times-Dispatch* editorial closed the doors of opportunity to many who might have profited by exploring the food possibilities of local plants and animals. The *Baltimore Sun*, in a most delightful spirit, took the same news item and stripped off all prejudice and pride, showing how the public was willing to pay exceedingly well for something they might offhand abhor. Possibly, one might question the ethics of the Baltimore cooks who fool the public with muskrat, but the proof of the muskrat is in the eating in this case. Whether it is good to eat or not rests neither with the *Baltimore Sun*, the *Richmond Times-Dispatch*, or with the Vice-President of the United States. The proof is in the eating.

Let us forget these prejudices and by the time this war is over we may find that all naturalists are not dumb, any more than all Richmond men sit at home reading only the *Richmond Times-Dispatch* while their wives run trap lines to keep the kettle full. The teacher who can find no classroom application to this discussion should not be teaching. With the exception of the home, what better agency is there than the school to stamp out prejudice?

THE POLAR SKIES

(Continued from page 492)

lation of Andromeda.

Venus is now a magnificent object in the morning sky. It will reach greatest elongation west of the sun on November 16, and will then rise about four hours before it and be high in the southern sky at sunrise. In the telescope, at that time, it will show the phase of half-moon.

Jupiter will be in quadrature with the sun on November 19, and will rise about midnight at that time. It will be in the constellation of Leo, a few degrees to the northwest of Regulus at the end of the handle of The Sickle. Next to Venus, Jupiter is the brightest object in the sky.

Saturn is now exceptionally brilliant as it approaches opposition. The rings are nearly at their widest opening and it is a beautiful object in the telescope. It is, at this time, in the constellation of Taurus, east of Aldebaran and between Orion and Auriga.

Mars will be nearest to the earth on November 28 but it will not be in opposition to the sun until

early in December. This is one of the less favorable oppositions and the planet's distance from the earth on November 28 will be 50,120,000 miles.

Sun and Weather

Solar Relations to Weather. By H. H. Clayton. Canton, Massachusetts, 1943. The Clayton Weather Service. Two volumes. Illustrated. \$3.00.

The exigencies of war have spurred human knowledge and research in many fields and one of these is meteorology. When men in numbers travel long distances through the air, as much foreknowledge of weather as is possible is a war necessity. Equally the movement of troops, the launching of military operations, the planning of naval activities depend largely on weather conditions for success. As a result many young men—and women—are being trained in weather knowledge, while the restrained prognostications now released to the public by the Weather Bureau have made many civilians with a scientific turn of mind weather students themselves. Thus there should be an even wider general interest in these two volumes than there might have been a few months ago. The first volume lays a groundwork by discussing solar relationship to weather and life—plants and animals and man—and speculates on the possible origin of solar variations. In the second volume are gathered under covers many papers written by the author. We are not competent to weigh the conclusions of Mr. Clayton, who has spent more than sixty years in the field, but it is plain that the student of meteorology will find much of interest and value in these volumes. They are not written for the layman.

Humane Key Award

Seeking to uncover the annual most outstanding contribution to humane education, the American Humane Education Society, 180 Longwood Avenue, Boston 15, Massachusetts, announces the award of the National Humane Key, together with two hundred dollars. This is a contest in which entries may include projects on a humane theme, humane plays or stories, original methods of teaching humane education, or theses on humane education. The contest closes April 30, 1944, and entrance blanks and rules may be obtained from the address quoted above.

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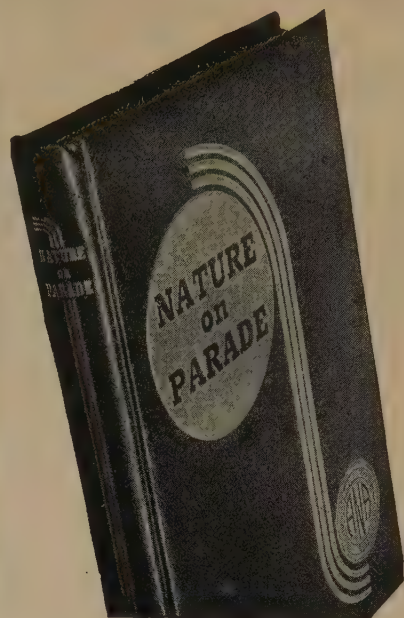
Black Oak Champ

On his old home farm in Pulaski County, Virginia, writes R. J. Wysor of Cleveland, stands an ancient black oak. Still in vigorous arboreal health, the tree measures sixteen feet, six inches around the trunk at five feet from the ground, where there is no perceptible swell in the girth. This is, Mr. Wysor says, the largest oak he has ever seen, and the picture reproduced above does not truly give an idea of its size. He wonders whether there are readers of Nature Magazine who know of larger oaks. Large trees have always been a special interest with Mr. Wysor.

Wood Pewee, Songster

The Song of the Wood Pewee.
By Wallace Craig. Albany, New York. 1943. New York State Museum. 186 pages.

There is, it seems to us, reassurance in the fact that in times like these such an extensive and thorough publication on the song of one of our birds can issue from the presses. This study in bird music, this reduction to terms of the solo abilities of *Myiochanes virens* may contribute not one iota to the winning of battles, but it provides evidence of the strength of a democratic people that will bring victory—they can fight and win a war without abdicating all other values. Dr. Craig's discussion is, of course, limited in interest to ornithologists and to music students, but through it he has made an interesting and able contribution to ornithological literature.



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NATURE IN PRINT

As a convenience to readers the books reviewed in the pages of Nature Magazine may be ordered through the book department of the American Nature Association, 1214 16th St., Washington 6, D. C.

(Continued from page 482)

slightly aware.

Luther Burbank: Plant Magician is perhaps not literally considered the best title that he might have chosen, for Luther Burbank's name has suffered among adults because of the many rash designations once used so freely by his less-discerning admirers. "The practical results of Mr. Burbank's work," wrote the horticulturist U. P. Hedrick in 1911, "have been as great or greater than those secured by any other person in plant-breeding, yet," he was compelled to add, "they have been magnified out of all bounds in the popular press and his work has been caricatured by calling the man a wizard and ascribing to him occult knowledge." John Y. Beaty, who helped Luther Burbank write an autobiography, has made no such errors of adulation in his text, however, and his young readers may be expected to be sophisticated enough to realize that a "plant magician" is no more inexplicable than the stage characters who merely *seem* to be taking nonexistent rabbits from the hat.

Luther Burbank was not only an artist among plantsmen; he was also among men an exemplification of intelligent diligence and singleness of purpose. The events and accomplishments of his life not only arouse interest but also kindle the imagination, and no one could write of them more effectively for children than Mr. Beaty has.

Dr. Hedrick declared that Mr. Burbank had "awakened universal interest in plant-breeding." This is a heritage the value of which is inestimable. Scientific plant breeders in recent years have, for example, developed hybrid corn varieties that last year added more than 600,000,000 bushels to the United States' annual corn crop. To what extent the interest of these scientists in plant breeding was in their

youth affected by the fame of Luther Burbank is not known, but it is certain that John Y. Beaty's young readers can profitably be aroused to the marvelous possibilities that Luther Burbank's work illustrates. They themselves may be the plant scientists of a decade after the next.

For the youngest of all those who may be influenced by Children's Book Week, there is a brilliant, newly-published volume entitled *Look and Learn*—a volume of colored pictures arranged not only to illustrate but to suggest concepts and stir the imagination. It is an intriguing volume even for adults. There is beauty in it. And the nearest it comes to even the suggestion of war is in a scene that children this year will likely describe as a Victory Garden. There is little more that can be said about *Look and Learn* without indulging in a discussion of the discerning and inspiring teaching method it advocates. It is to be seen, not described. It is the most welcome book that has come into at least one home for children who can not yet read, and its vivid interest is likely to last for some years. It is a Children's Book Week Special.

Beyond the Clapping Mountains: Eskimo Stories from Alaska. By Charles E. Gillham. New York: The Macmillan Co. 1943. 134 pp., with 13 drawings by Chanimun. \$1.50.

Luther Burbank: Plant Magician. By John Y. Beaty. New York: Julian Messner, Inc. 1943. 251 pp., with 19 drawings and endpapers by Luis M. Henderson, list of Burbank's creations and plants with which he worked, and index. \$2.50.

Look and Learn. By Wilbur L. Beauchamp, Gertrude Crampton, and William S. Gray, Reading Director. Chicago, Dallas, Atlanta, and New York: Scott, Foresman and Co. 1943. 72 pp., with index to concepts and more than 400 colored illustrations by Edna Farmer, A. F. Hurford, Miriam Story Hurford, Earle Kirkbride, John Merryweather, J. M. O'Malley, Gregory Orloff, Dewey Proebsting, and Walter A. Weber. 84 cents. Teachers' Edition, with 36-page guidebook and bibliography, 84 cents.

Trees for Shelter

Shelter Trees in War and Peace. By Ephraim Porter Felt. New York. 1943. Orange Judd Publish-

ing Company. 320 pages. Illustrated. \$2.50.

In the tremendous activity connected with the establishment of camps, airfields and other military centers, and in the expansion of war industries, a great many trees valuable for protective concealment have been injured. Many of these can be saved at a fraction of the replacement cost, and thus immediately serve the protective purpose for which they are so fitted. This problem provides the author of this book a theme for his discussions of tree growth, care and values. Dr. Felt has written extensively on shade and ornamental trees, and in this immediate volume he finds an opportunity to relate this information to a vital subject of the moment. Nor is it only of the moment, for wise use of trees for the future in connection with military establishments, industry and highways is brought into sharp focus as something that must be considered today. Setting aside the war angle, this volume contains much valuable information for anyone concerned with trees, which, the author points out, "are too common for most to appreciate their full significance."

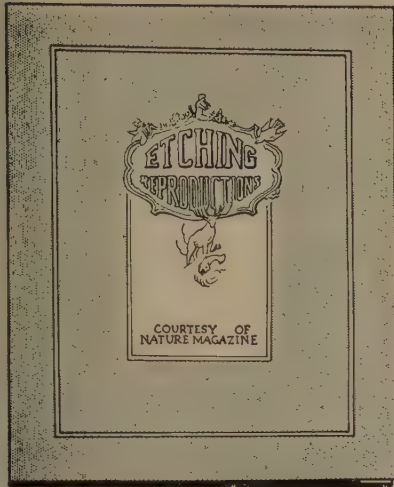
Illinois Parks

Illinois has set aside for the recreation of its citizens and visitors from other States, fourteen State Parks, eight State Historical Parks and two State Parkways. Also, to preserve points of historical importance, it has established fifteen State Monuments or Historic Sites. These are distributed all the way from Chain O'Lakes State Park, in the north, to Fort Massac Historical Park, in the extreme south. To bring the facts about the reservations to public notice, the Division of Parks and Memorials of the Michigan Department of Public Works and Buildings has brought out an attractive, illustrated booklet entitled *State Parks and Memorials*. It is available free from the Department at Springfield.

North Carolina Bird

With the North Carolina Legislature of 1943 officially recognizing the cardinal as the State Bird, the number of States lacking official bird insignia is reduced to fourteen. Illinois, Indiana, Kentucky and Ohio are other states that have chosen the cardinal. Missouri, earlier listed as having no official bird, adopted the bluebird in 1927.

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On Your Own

On Your Own. By Samuel A. Graham and Earl C. O'Roke. Minneapolis. 1943. University of Minnesota Press. 150 pages. Illustrated. \$2.00.

This is a manual for field and service men and is designed to provide concise information on how they may take care of themselves in wild country. The authors do not seem to have overlooked any exigencies that might arise. They cover physical extremes of sun, temperature and exposure; prevention and treatment of minor injuries and infections; quicksands, quagmires and water hazards; food in the field; edible wild plants; wild animals that may be caught for food; protection from poisonous plants; dangerous animals; insect pests; how to avoid animal diseases; parasites that attack man, and equipment needed in the field. Although this book is related to the war—as so many things have a way of being these days—its value is certainly not confined to the man who is called upon to go afield in uniform.

Keeping Bees

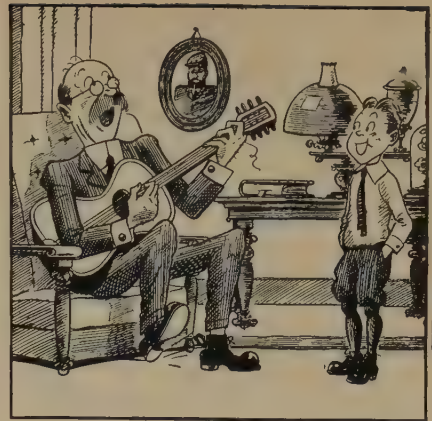
Beekeeping for Profit and Pleasure. By Addison Webb. New York. 1942. The Macmillan Company. 116 pages. Illustrated, \$2.00.

With honey taking on more importance in filling the American sweet tooth, this practical and simple discussion of beekeeping has a particularly timely significance. The author discusses the different kinds of bees, life in the hive, equipment necessary, details of hive handling, management during the seasons, diseases and enemies, honey plants and all other essential details. He writes from a background of beekeeping in city and country.

Correspond?

John Trott, Jr., New London, North Carolina, would like to correspond and exchange specimens with others interested in the collection of birds' nests.

"Answering your advertisement in Nature Magazine"—if readers will use this phrase in responding to advertising it will be most helpful to your Association and to the Magazine. Advertisers base their use of space on response, but in publications like ours many readers do not like to mar the magazine by cutting out coupons from inside or the cover. If you do not use the coupon please let the advertiser know where you saw his message. Thank you.



*"...and you'll always have tobacco
in your old tobacco box!"*

When I was a kid my father used to sing a song that ended up with this refrain:

*"Oh, save up your money and put it in
your sox*

*And you'll always have tobacco in your
old tobacco box."*

Well, the words stuck with me, but I guess the moral didn't.

No matter how hard I tried . . . I never seemed to be able to save up a red cent.

But it's all different now!

About ten months ago, I started buying War Bonds on the Payroll Savings Plan. Figured it was the least I could do for Uncle Sam.

And that's the *only* way I thought about it . . . until just recently!

Now, all of a sudden, I've discovered that—for the first time in the history of Yours Truly—I'm *saving dough*. Every month, rain-or-shine, hell-or-high-water, I'm sticking away a War Bond, a Bond that'll bring me back \$4.00 for every \$3.00 I put in.

Those Bonds are beginning to mount up now. And I'm going to *keep* them mounting up . . . buying more and more War Bonds as I go. For I've discovered what a swell feeling it is to be *saving* . . . on a plan that's regular as clockwork and twice as sure.

So I'm singing father's song . . . a little different. . .

*"Oh, save up your War Bonds and put
them in your sox*

*And you'll always have money in your
old tobacco box."*



**YOU'VE DONE YOUR BIT . . .
NOW DO YOUR BEST**

— BUY MORE WAR BONDS —

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contribution to America's
all-out war effort by*

American Nature Association

SILVER WEDGES

(Continued from page 464)

Beet farms are, in most cases, grouped in the vicinities of the refining factories, or at least close to convenient railroad points. After the harvest, wagons loaded with the uprooted silver wedges converge on the factory. There huge piles are built up since—except in California—the factory cannot keep up with the flow of beets. “Beet pay day” in the sugar towns is a gala time. Stores advertise sales and bank tellers labor overtime.

The farmer now looks forward to his next crop, but the factory hums with activity. Which brings us to the noodle-punching. From the stockpile the beets travel in a flume of rapidly-moving warm water, getting a preliminary bath. This carries them into a tank for a second dunking, and a scouring with the aid of a large rotating paddle. From this they tumble on a scale, and then fall into revolving knives, which cut them into cossettes, one of the many French terms still used in the industry. Cossettes resemble shoestring potatoes. High speed belts carry them to a group of large cylindrical tanks—the diffusion battery. As the cossettes pour into the tops of the tanks, the battery crew, armed with tridents, push the cossettes in. They are noodle-punchers.

Sugar is now in the making. Hot water, moving restlessly from tank to tank, extracts from the cossettes a raw juice and beet pulp. The latter goes off to a wet-pulp silo, or to a dryer, its eventual destination being the digestive tracts of domestic stock.

Raw juice goes on to be mixed with milk of lime, which, with the aid of carbon dioxide bubbled into it, coagulates and makes separable the non-sugars it contains. That part of the juice holding sugar in solution is separated by filtration. Thus is left the first press juice—destiny, sugar; lime cake—destiny, soil treatment.

Carbon dioxide is again introduced, and filtering removes the remaining lime. The resulting thin juice contains from ten to twelve percent sugar. A series of steam evaporators produce a juice containing fifty-five percent sugar. Sulphur gas enters the picture to adjust finally alkalinity, and a careful filtration leaves a clear and sparkling liquor known in factory parlance as “blowup thick juice.” This is boiled under reduced pressure until sugar begins to crystal-

lize, leaving a thick mixture of crystals and syrup.

In a spectacular final process, high-speed centrifugal machines whirl the “mother liquor” at a speed equal to more than two miles a minute. The syrup flies through a metal screen, the crystals clinging and the whole mass turning to the snowy white we know in our sugar bowls. Jets of hot water remove the last trace of the syrup. There is nothing more awaiting the sugar but the granulators that dry it, and the warehouse where it is sacked and stored.

Thus in a little less than two centuries the sugar beet has moved from the subject of inquiring experiment in a chemist’s laboratory to an industry supporting thousands of farmers and workers. Indeed, it is unique in that within the memory of man in the United States it has progressed from scratch to an industry whose products are valued at \$125,000,000 annually.



Jack Miner Honored

It is reassuring in these days, when the medals and honors are properly being bestowed upon the officers and men who are fighting our battles, that King George VI of Great Britain should see fit to honor one whose life work has been conservation and the preservation of life. This he recently did in making Jack Miner of Kingsville, Ontario, Canada, a Member of the Order of the British Empire. Founder of the famous bird sanctuary at his home, Jack Miner has been host to thousands upon thousands of migratory and resident birds since 1904. He has banded more than 50,000 ducks and nearly 30,000 Canada geese.

The far-reaching extent of his work is indicated by a recent word from Maracaibo, Venezuela, of the shooting of two teal wearing bands placed on their legs by Jack Miner in September, 1938. It is interesting that these two birds were banded at the same time and, apparently, have remained together during the intervening five years.

Iowa Waterfowl

Waterfowl in Iowa. By Jack W. and Mary R. Musgrove. Des Moines, Iowa. 1943. Iowa State Conservation Commission. 122 pages. With 12 color plates and decorative line drawings by Maynard F. Reece. One dollar.

Designed to aid in the identification and knowledge of the waterfowl that have, according to record, been known to Iowa, or might conceivably occur there, this book is published to provide an inexpensive handbook. Each bird is described in its adult male and female plumage, and its juvenile plumage. Field marks, calls, breeding range migration habits, winter range nesting, food and status in Iowa are provided for each species. Brief general chapters supplement this information, and an identification key is provided.

Golden Anniversary

Too late for us to record it in advance, or even simultaneously, information came to us about the celebration of the fiftieth anniversary of the Field Museum of Natural History in Chicago. This took place on September 16 in commemoration of the issuance of a charter on that date in 1893 to the Columbian Museum of Chicago. The following year the name was amended to become the Field Columbian Museum. In 1905 the present name was adopted and at the anniversary ceremony it was announced that the name would henceforth be the Chicago Museum of Natural History. Gifts totalling \$9,430,000 were made to the Museum by the late Marshall Field. During its fifty years of service, the Museum has sent 440 expeditions ranging about the world; has brought out 566 scientific publications and 88 popular leaflets. It has been host to more than thirty-three million visitors. As the Chicago Museum starts on its second half-century it can look back on fifty years of valuable and constructive service. Congratulations!

NATIONAL WAR FUND

BY AUGUST DERLETH

Those of us on the home front who have long been united in the never-ending operation for the conservation of natural resources can respond wholeheartedly to the new National War Fund drive. Like the constant drive on many fronts to protect and maintain our forests, our wildlife, and all the wealth of our good earth which is the people's, this unification of all charitable agencies into one expertly administered body, described as "a combined operation for all good purposes against all bad causes," must surely enlist the support of all of us who have found it difficult to select among USO, Russian War Relief, Refugee Relief Trustees, War Prisoners Aid, and so on, which is to receive any contribution we can make. Now these agencies, sixteen of them, have united under the banner of the National War Fund, to best finance the needs of the separate agencies within its unity.

And in this unity lies the greatest single evidence of the spirit of the world of tomorrow—the coming together of people for the benefit of all races the world over; the unification of the will to do with the act; the signpost on the road to tomorrow. Even as those of us who have long served the cause of the conservation of natural resources—this, too, a service for tomorrow, for the things of the good earth belong to all peoples throughout the world—can understand how much greater can be the efficiency of such a body as the National War Fund over the individual services of a score of lesser agencies, competing against one another, trying to serve the people of the world without that vitally necessary co-ordination now offered by this federation of war philanthropies, the National War Fund.

Whatever contributions are made to the National War Fund will be channeled into that relief which is most pressing, most vital for the good today and tomorrow of the majority of earth's peoples. The National War Fund thus offers increasing assurance that we, as Americans, can and will direct our philanthropic energies into those channels that will assure not only victory in the war, but victory over want and insecurity in the new world of tomorrow, just as thousands of us have fought the unceasing battle for conservation of our natural resources so that

the man and woman of tomorrow may also draw upon the riches of the earth to assure their future and that of those who come after them.

Plants for Eating

Edible Wild Plants of Eastern North America. By Merritt Lyndon Fernald and Alfred Charles Kinsey. Cornwall-on-Hudson, New York. 1943. Idlewild Press. 452 pages. Illustrated. \$3.00.

More than one thousand wild plants fit for food are discussed in this book, which is, we should say, the last word on the subject. The authors, in gathering material for this book, have done a valuable service of experimentation, testing and regularly eating the wild things about which they write. In the first chapter the edible plants are classified according to uses—all the way from purées and soups to table oils and butters. The second chapter discusses poisonous flowering plants likely to be mistaken for edible species, while the third chapter is devoted to a detailed enumeration and discussion of edible wild flowering plants and ferns of eastern North America. The final chapter treats with mushrooms, seaweeds and lichens. It is quite plain that this book should take its place beside the kitchen cook book, not only for use in these rationed days but for use in times less culinarily complicated.

Substitutes and Synthetics

Encyclopedia of Substitutes and Synthetics. By Morris D. Schoen-gold. New York. 1943. Philosophical Library, Inc. 382 pages. \$10.

Between Abalyn and Zelan are a tremendous number of products that the industrial chemist and research man has discovered and developed. Some of these have come into use because the exigencies of war have created the demand, or the fortunes of war have cut off our normal peacetime sources of certain natural resources. So "something just as good," or something that will adequately take the place of that which we cannot get, comes into use. In this interesting and valuable compilation the author gives such information about these synthetics and substitutes as is known, and lists their uses and the products that they have replaced. It should be a useful reference book to many, although at the present rate of progress it may soon have to be revised.

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(Continued from page 460)

pink at that.

Next the police sent a constable to settle a small matter of two quarts of milk consumed by a monster that the town stated—and the law upheld—could only have come from our house. Apparently Rima had quietly advanced from behind upon a poor woman delivering fresh milk and had given her such a case of the willies that she had dropped two of her bottles.

Finally Rima herself arrived, dragging behind her a portly sergeant of the Colonial Defence Force attached to a lead.

It transpired that she had strolled through the town, greatly alarming the populace in the half-light of morning, for, although capybaras are indigenous to the country and plentiful enough up country, they are seldom seen unattended in the main street of the capital. Rima had sampled the herbage on the public park and then had endeavored to enter the residence of the Governor, but, being turned away by a vigilant sentry, had proceeded to the barracks and taken up her residence under the trees by the officers' mess.

The young officers happened to be Dutchmen straight from Europe who naturally did not believe in three-foot guinea-pigs. They ordered it—whether real or imaginary—to be removed at once, so the guard was turned out and the dignified phantom cornered. A young officer unbelievably informed the police, but even the compounders of Dutch law had not envisaged anything so outlandish. Fortunately a friend of ours spotted and recognized Rima standing majestically in the midst of a circle of slightly skeptical soldiery and told them where she belonged. The poor sergeant was forthwith dispatched on what must have proved the most embarrassing assignment of his military career. It took two whole steiners of beer to revive him at our house and he was still tottering when he left.

Unlike many pets, Rima indulged in no tricks; she had no strange habits; she could never be accused of being cute nor wittingly funny nor fiendishly clever. She was just a patient and deliberate animal imbued with outstanding common-sense and an unbounded supply of mother-wit. She came to us fully domesticated and she did not have to be cajoled into our ways or taught our habits. On the contrary she promulgated her own

rules of procedure and imposed them upon us.

She ate regularly twice a day and at times laid down by herself but by which we could have set our watches. She attended to her own toilette and was always immaculate. She entertained herself. She entered fully into our family life, meeting all visitors, abusing none but bestowing attention upon few. She also visited friends with us and she maintained a solemn vigilance over the servants' every action. She advanced sternly upon skulking dogs that entered the yard with felonious intent, she sailed past the caged animals, head held high with indifference, but she befriended and solemnly mothered a gentle little fawn that was alone in the world of our garden.

When we left the country we had to leave Rima behind. One cannot share a stateroom on a liner with a two-hundred-pound guinea-pig—not even on a Dutch boat. I will never live down my desire to walk along Fifth Avenue preceded by Rima clothed in a dark blue winter coat trimmed with orange and emblazoned with the coat of arms of the Royal House of the Netherlands.

We left her in the good care of dear friends who loved and appreciated her almost as much as we had, and who already knew her only a little less intimately. For Christmas, 1942, we each received cards. They displayed a portrait in regal pose and inside was inscribed:—

"To our dear friends, with our sincerest wishes for Christmas and for all good fortune and peanuts in this coming year of Grace. (Signed) Rima."

EARLY TERRORS OF THE DEEP

(Continued from page 490)

threw out the romantic and the bizarre in favor of coldly authenticated detail. But something was lost in the transition—something childish and ridiculous and endearing. It is one thing to learn that

"... *Delphinus delphis*, common dolphin, has beak about 5 in. long in middle line, separated from rest of head by a distinct groove. Mainly black above and white below, the sides with longitudinal streaks of white, brown, yellow or grey. Palate of skull with two deep longitudinal grooves.

Teeth 40-50, diameter 3-3.5 millimetres. . . ."

And it is quite another thing to read that in 1687 there appeared in All Saints Bay, Brazil, a creature

"... unbelievably huge, of terrifying shape, with a face like that of a sea-cat, with feet like those of a lion, and the upper part of the body like that of a person. Yellow of neck and fiery of eye . . . so terrible that a soldier fell dead just looking at it. . . ."

TREE RINGS FOR VICTORY

(Continued from page 484)

settled law suits. A celebrated case is the State of New York *vs.* Belkin. Tree-ring evidence saved a family property. Belkin land faced the east bank of the Hudson, near the new Albany-Rensselaer bridge. Using old maps and other records, the state tried to prove that the shoreline of the Hudson originally ran 136 feet east of the Belkin house. The state sued to annex the property without payment, contending that the Belkins were living on filled-in land.

On the disputed property, at the river's east edge, stood an elm. Armed with his increment borer, a forester took a tree-ring record of the tree's age. The tree was dying of old age. Ten feet in circumference, the ancient elm was hollow with decay, long past the time when it was of any economic value as timber. But the trunk's live shell was twelve inches thick and it was possible to bore out a core that contained 96 annual growth rings. Expert readers, studying the rate of growth and making due allowance for the wider growth rings that had been destroyed by inner rot, were able to establish that the tree was more than 200 years old.

The elm could not have grown in the water. It could not have survived if it had started life on a mud flat that was submerged at high tide. The State carried the case through every New York court. But the evidence of the growth-rings proved conclusive, and the Belkin elm's rings won.

This is only one case where tree rings have tattled on the past, but a study of tree ring records has proved that they can, as well, aid in foretelling climatic conditions of the future. Scientists have learned the wisdom of consulting Nature, for they have found her very reliable. They have found, for one thing, that tree rings do not lie, if their story is read.

Hornaday Memorial

"Open wide to youth all gateways to Nature," advised the late William T. Hornaday, naturalist, conservationist, museologist and friend of children. It is fitting, therefore, that the William T. Hornaday Memorial Foundation should plan to perpetuate his memory and promote his principles through "the establishment of a living memorial in the form of a foundation for the benefit of children." Specifically, the object will be carried out through the promotion and organization of "Children's Museums . . . in areas where the greatest benefit may be derived." The Foundation, under the presidency of Arthur B. Carr, and with a distinguished list of sponsors and trustees, is now conducting a modest campaign to launch the program. Space here does not permit detailed discussion of the program. This can be obtained from the Director of the Foundation, John Ripley Forbes, currently Sergeant Forbes, whose address is Post Library, Napier Field, Dothan, Alabama. Contributions may be made to Miss Charlotte E. Owen, Treasurer, Stamford Trust Company Building, Stamford, Connecticut.

NATURE OR NAZIS?

BY RALPH W. DEXTER

War time arouses suspicion, and people seem to notice things that in time of peace would pass unnoted. Two incidents that recently came to my attention indicate how the human mind works.

Some workmen were clearing out an abandoned factory at Kent, Ohio, to recondition it for war work. Hiding under some debris, a large insect was uncovered and caused excitement among the workmen. The creature was finally cornered and gotten into a box. It was declared that Nazi agents had planted a dangerous and poisonous insect, so the evidence of this enemy sabotage was brought to me for identification. It proved to be a common mole cricket.

Early this year some insect larvae were received from Somerset, Pennsylvania, with the statement that a light over-night snow had been found sprinkled with small insects. Rumor had run about that Nazi agents had spread them. They were nothing more than the larvae of ladybird beetles.

While eternal vigilance against sabotage is necessary to national safety, suspicion can really run riot when rumor starts its way

about. It may be that such incidents as these, which are probably numerous, will result in more general interest in and knowledge of Nature and her creatures.

This Fellow, Man

Speaking of Man. By Michael F. Guyer. New York. 1943. Harper and Brothers. 320 pages. \$3.50.

Michael F. Guyer is Professor of Zoology at the University of Wisconsin, a noted biologist, and—after reading this book—high on the list of men we should like to know. Spurred by the spectacle of man writhing in the serpentine coils of the civilization he has created, Dr. Guyer set for himself the task of showing what makes man, individually and collectively, what he is. He has performed this task in a stimulating book that is delightfully written and for the literate reader.

At the very outset of the book, Dr. Guyer disposes of the critics of science and its contributions in a brilliant chapter that lays the groundwork for the subsequent discussion of man in the natural scheme. Then follow searching and fascinating chapters on man's behavior, his management of his mind, sex, and other phases of man's relationship to other men. The approach is, of course, that of the biologist and in the light of recent knowledge of glands, hormones, vitamins and such. We found the chapter on "The Endocrine Control of the Body" the most understandable popular account of this avenue of biological progress that we have encountered.

When Dr. Guyer ventures discussion of 'teen-age boys and girls he seems a bit out of his element, and to have drawn a bit too heavily on the movie and fiction magazine versions of 'teen-age actions and reactions. Our seventeen-year-old dismissed this chapter with a sniff and the suggestion that the author better stick to zoology. From our own association with a legion of these youngsters about the house, we are inclined to agree in this minor particular.

This passing emphasis on clichés about youth, however, does not affect the outstanding worth of the whole book. Dr. Guyer's chapter on "Democracy as a Biological Problem" stands by itself as a penetrating discussion from a viewpoint too often ignored. We commend this volume for reading and rereading, and we are indebted to Dr. Guyer for speaking of man in the terms that he has spoken.—R.W.W.

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Under the Microscope

By JULIAN D. CORRINGTON

OF LICE AND MEN

Among the Orders of Insects particularly attractive to the microscopist are those in which the individuals are so small as to require mounting on slides for structural studies. Lice and fleas are especially noteworthy among such groups, and are of great interest on account of their parasitic habits and rôles as vectors of diseases. We have considered the Mallophaga or chewing lice in the January, 1943, issue, and turn next to the Order Anoplura, the sucking lice or true lice.

At one time these were classed as a part of the old heterogeneous Order Hemiptera (bugs) and have also been designated as the Siphunculata, Parasitica, or Parasita, as well as by other synonyms. Parasita seems to have priority, but we are following custom here in retaining the name Anoplura, which means "unarmed tail," in a feeble attempt to describe the broad and exposed abdomen.

These lice are obligate parasites—cannot exist except on their hosts—and infest mammals exclusively. Like the chewing or bird lice, they have no wings, metamorphosis, ocelli, or cerci, but differ from them in many other respects. The thorax is narrow and partially fused, its segmentation indistinct; the head is small and narrow, with prominent antennae of from three to five joints; the compound eyes are present in reduced form in species attacking man and related primates, absent in those parasitizing other

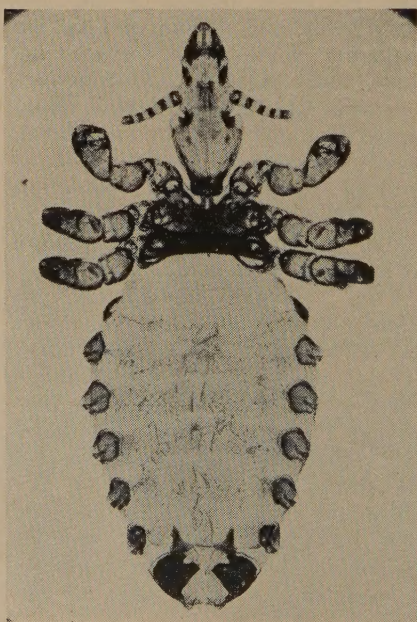
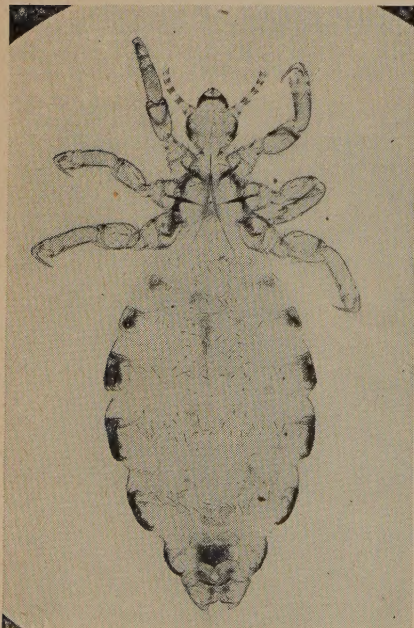
mammals. All of the legs end in a grasping claw, adapted to cling tightly to hairs of the host, who assiduously endeavors to remove these pests by scratching or rubbing. The tarsus consists of a single segment, often with a projecting thumb-like process against which the sharply recurved claw closes. The abdomen is circular to oval, and spiracles are dorsal or dorso-lateral in position.

The most striking peculiarity, however, concerns the mouthparts, which are of the piercing-sucking type. In the mouth cavity there is a dorsal pharyngeal tube (buccal funnel) and a ventral, blind, sac-tube (or stylet sac), like an inverted glove finger. Externally occurs a fringe of six pairs of minute hooks that secure a grip on the skin at the place selected for one of the louse's frequent and unwelcome nutritional exercises. Stylets, representing highly modified mouthparts, are run out of the sac-tube and stab a wound in the host's skin, saliva passes into the puncture, blood flows onto the surface of the victim's skin, and now the pharyngeal tube is applied to suck up this oozing blood. According to some of the specialists on this group, blood is sucked directly from the wound. Later the stylets are withdrawn into the head and again are unseen except upon a most careful and difficult dissection. The punctures itch terrifically.

Female lice lay eggs, termed "nits," which are whitish oval bodies, usually glued to host hairs. These soon turn yellowish-brown and are frequently large enough to be visible without any magnification, though requiring a microscope to be seen in any detail. They are operculate—having a cap at one end, through which the young louse emerges, after one to three weeks, and make very favorable subjects for studies in insect embryology. After three or four molts the nymph is mature and the cycle complete in from two weeks to a month, varying with the species and temperature. Adults live one month or somewhat longer, females laying eggs daily for a considerable portion of that time—several hundred in all—and there may be six to twelve or more generations per year, young and adults dwelling together.

In spite of the fact that nearly all anoplurans show

From left to right are females of the human body louse, the sucking horse louse, *Haematopinus asini*, and the long-nosed ox louse, *Linognathus vituli*. Photographs from slides loaned by Ward's Natural Science Establishment.



a marked host specificity—that is, will live on only a single species of host mammal—and, further, that nearly all orders of mammals, even seals, armadillos, and elephants, are infested, the Order at present is one of the smallest of insect groups, only some five hundred species having been described. Doubtless many more await discovery. The two chief families are the Pediculidae, on man and his relatives, and the Hæmatopinidae, on many other types of hosts, the hog louse being a favorite example for study, owing to its large size (nearly ¼-inch in length) and ready availability.

Man is infested by two species, the human louse and the crab louse, of which only the first is concerned with disease transmission. This is the celebrated “gray-back” of the Civil War, or “cootie” of World War I. It remains to be seen whether the present conflict will bring forth a new popular name for this age-old camp follower.

Much research and discussion have centered around the question of whether the head louse and the body louse of man are two separate species, two varieties of one species, or are identical, the middle view being preferred at present. The body louse has been named *Pediculus corporis* and *P. vestimenti*, since it remains attached to the clothing except when feeding; the head louse was known as *P. capitis*. Since adoption of the single species concept, however, taxonomists have gone back to the original Linnaean designation, *P. humanus*, and some refer to *P. humanus corporis* and *P. humanus capitis* in distinguishing the varieties. The two will interbreed and the evidence as to their relationship is conflicting. Ewing believes that the head lice of various races of mankind were originally distinct, the present form being a hybrid, while the body louse is considered to be an offshoot from the head louse stock that arose when clothing became adopted.

Louse infestation is *pediculosis* in medical language. The many toxic and irritating bites bring on an eczema-like eruption and discoloration of the skin that may be very severe. Chief importance, however, centers in the fact that the body louse is the vector of the highly-feared typhus fever, as well as trench fever and European relapsing fever, all very serious diseases and apt to become epidemic whenever large numbers of people are crowded together under conditions of bad sanitation, not-

ably the case in war times. There is an endemic and milder form of typhus that is concerned with a rat-flea-rat cycle in which man is no more than an accidental host when bitten by an infected rat flea, but the terrific, highly fatal, and epidemic form of typhus is always louse-borne, and the cycle is louse-man-louse, and without the intervention of any secondary host. Much progress has been made in preventing pediculosis in the present war, mainly through the use of dusting powders, and the fumigation provided by delousing stations is likewise important, but little if any improvement has been achieved in treating the disease, once it has made an inroad upon the body.

Specimens for mounting may be obtained by contacting the local public health official or department, or bought from supply houses. The technique should include potashing, careful positioning, and thorough dehydration, but does not differ from that for any other insects of small size.

HISTORICAL OUTLINE

The man destined to give the *coup de grâce* to the old and persistent theory of spontaneous generation was Louis Pasteur, one of the greatest personages in the whole of human history. The famous French chemist and bacteriologist was born at Dôle in 1822, the son of a tanner. His first appointment was as professor of physics at Dijon, soon afterward removing to Strassburg, then to Lille, and finally to Paris in 1857, where he was associated with various faculties, notably as professor of chemistry at the Sorbonne and later Director of the Pasteur Institute.

The genius of Pasteur is revealed by the brilliancy of his researches, all of which were epoch-making in character. Those who recall the splendid motion picture of his life will remember that he began as a chemist, with important studies on the salts of tartaric acid. As this substance is a byproduct of fermentation, and inasmuch as a local distillery was experiencing trouble with lactic acid forming in their alcoholic fermentations, and from patriotic desires to make the beers and wines of France superior to those of England and Germany, Pasteur turned to an investigation of fermentation, thus embarking on his career as a great biologist, and to the everlasting benefit of mankind.

In 1857 he discovered that this universal process is due to living

Background for the Microscope

Equipment for the pursuit of microscopy may be as simple or as elaborate as individual inclinations dictate; but there is one item wholly indispensable—books! The microscope is handmaiden to all the sciences, and those who follow its adventuresome trail must have many a guide to direct along the right path.

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organisms, leading him to exhaustive studies of the entire field of fermentation, decay, and putrefaction. His *Etudes sur la Bière*, published in 1876, is the master work on the subject. Meanwhile, the celebrated German chemist, von Liebig, had synthesized lactic acid in 1850, and regarded its formation, as well as alcoholic fermentation, as strictly a chemical process. Any foreign organisms that might be present were but passive bystanders. A long and bitter controversy between the two giants ensued, resulting in an overwhelming victory for Pasteur when he took pure sugar and mineral salts and, by adding a little yeast, produced alcohol. He went on to prove that each type of fermentation, as in specific wines and beers, is caused by a distinct variety of cultivated yeast, and that ropy wines, sour beer, and the like were produced when the manufacturer's yeast became contaminated with wild yeasts and certain bacteria. This work saved the wine industry of his country, and was widely recognized.

Pasteur at this time foresaw that if foreign organisms, introduced from the air or on the ingredients or apparatus, caused "diseases" of wines and beers, so the diseases of mankind and animals might also be due to microorganisms. The immediate consequence, however, was to draw him into the still unsettled controversy over spontaneous generation. The last two proponents of this outworn theory, and bitter enemies of Pasteur, were Pouchet and Bastian. In 1858, Pouchet asserted he had obtained microorganisms by spontaneous generation in solutions exposed only to pure oxygen. He claimed to have repeated many experiments of Schwann, Schultze and Pasteur, and to have obtained invariably opposite results. When it was finally arranged for the two men to meet at the Museum of Natural History, Pasteur performed a number of convincing experiments, but Pouchet refused to perform any of his own at all. This convinced skeptical scientists, and Pouchet disappeared from the picture.

In England, Bastian carried on the fight for spontaneous generation for more than a quarter of a century longer, finally enjoying the dubious distinction of being the last of his clan. All other educated persons had long since abandoned the age-old but sterile belief.

Pasteur, in taking up the cudgel, had been forced to repeat Spallanzani's experiments and devise many of his own. This work was marked by his invention of the Pasteur flask, a rounded glass container with a long swan-necked curve in its stem. Broth placed in the flask was boiled and allowed to cool. If undisturbed, it remained sterile, bacteria in the atmosphere being trapped by one of the curves of the open glass stem. Air could enter freely; only dust was excluded. If the flask was violently shaken, or if tilted so the contents made contact with the bottom of the neck bend, or if the neck was broken off, the broth speedily putrefied. The only change effected by these treatments was that the broth had been contaminated by some of the dust that had settled in the stem. Some of these undisturbed flasks prepared by Pasteur are still in existence today, and are as clear and unspoiled as when first set up.

Pasteur's paper on spontaneous generation was published in 1861, a date that may be taken as marking the final overthrow of this theory. One other worker, however, remains to be noted. John Tyndall (1820-93) was interested in observing how a beam of light was broken up into a spectrum when passed through air containing much dust (1876); hence he concluded he could employ such a beam to detect the presence of dust. His dust-free box is now cel-

ebrated. There were glass windows at the two sides and a glass front to this box. Twelve large test tubes projected from the floor, their mouths opening inside the box, while the roof was provided with two unsealed glass tubes, each with a number of bends so as to admit air but exclude dust. Held in the roof by a rubber diaphragm was a thistle tube by means of which broth could be introduced to the test tubes. The interior of the box was coated with glycerin to trap floating particles, and a beam of light sent through the otherwise darkened box, through one of the two side windows. When first set up, the beam was seen within as well as outside the box, but after a few days the beam could no longer be seen inside as there were no remaining dust particles to intercept and reflect the light to the observer's eye. Now the tubes were filled with a culture medium through the thistle tubes, and were sterilized by immersing them in boiling brine for five minutes. Other tubes, as controls, were similarly treated but were outside the box. The controls putrefied within a few hours; the tubes opening into the box remained fresh.

In our next chapter we shall discuss how this work on spontaneous generation, itself a barren theory, led to many far-reaching and vastly important discoveries.

TRADE NOTES

We owe an apology to Dr. William J. Byles, Director, Imperial Technical Institute, Austin, Texas, and to those of our readers who wrote to him as a result of our description, in the August-September issue, of his correspondence course in clinical laboratory technique. We must have suffered some form of mental lapse, giving Houston instead of Austin as the address; so we will consult our favorite psychiatrist, eat more fish, and otherwise attend to the prophylaxis of flagging brain cells, meanwhile advising those interested to write again.

The Study of the Physical World, by Cheronis, Parsons, and Ronneberg, is a large book and an ambitious undertaking, admirably executed. Its aims are to present the basic findings of the physical sciences, to teach appreciation of the scientific method, to stimulate interest in the materials and processes of the physical universe, and to compel an awareness of the importance as well as of both the benefits and the social implications and obligations of scientific progress.

Mathematics, physics, chemistry, geology, and astronomy are all incorporated, but as parts of a continuous story and not as separate chapters; this treatment makes for a unified concept and stresses the interrelations and dependencies of each. We believe the authors have succeeded remarkably well with these difficult aims, although we would disagree with their opinion that it is neither feasible nor desirable for the general student to be required to take a laboratory course.

The style of the several writers is lucid and interesting and they develop their subjects logically, with sometimes the historical background, often the philosophical implications, and commonly the practical applications. The format and type used make for a very attractive and easy-to-read volume; the illustrations are remarkably good and well selected. For those of our readers who would enjoy a refresher course or would like to obtain an up to date survey of the findings and methods of physical science we recommend this book as an enjoyable experience. Pp. xii, 884, xiv; figs. 467. Houghton Mifflin Co., 2 Park St., Boston, 1942. \$3.85.